

**Responsiveness Summary
Malvern TCE Superfund Site
East Whiteland Township, Chester County, Pennsylvania**

This Responsiveness Summary is divided into the following sections:

Overview

The overview summarizes the public's response to remedial(cleanup) alternatives listed in the Proposed Remedial Action Plan ("Proposed Plan"). The Proposed Plan outlined various methods of cleanup of the Malvern TCE Site and discusses EPA's preferred method.

Background

This section provides a brief history of community relations activities conducted during remedial planning at the Malvern TCE Superfund Site.

I. Summary of Major Comments and Questions Received During the Public Meeting and EPA Responses

This section documents comments and questions from citizens and potentially responsible parties during the July 16, 1997 Public Meeting at Great Valley High School in Malvern, PA. These comments and questions and EPA's responses are categorized by topic.

II. Summary of Major Comments and Questions Received During the Public Comment Period in Writing and EPA Responses

This section provides a comprehensive response to all significant comments received in writing by EPA during the Public Comment period.

Overview

The Proposed Plan for the Malvern TCE Site (Site), located in East Whiteland Township, Chester County, Pennsylvania was issued on June 23, 1997. EPA's public comment period for the Site was originally scheduled to run from June 23, 1997 through July 23, 1997. This

comment period was extended until September 2, 1997 in response to several timely requests. EPA conducted a public meeting on July 16, 1997 to present the Proposed Plan to the public. At this meeting, the public was given an opportunity to ask questions and to comment on the cleanup alternatives outlined in the Proposed Plan and the results of the Remedial Investigation (RI) for the Site. The Proposed Plan details EPA's preferred clean-up alternatives to cleanup the Site contamination, giving consideration to the following nine evaluation criteria:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with Federal, state, and local environmental and health laws

Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of mobility, toxicity, or volume of contaminants
- Short-term effectiveness
- Ability to implement
- Cost

Modifying Criteria

- State acceptance
- Community acceptance

EPA carefully considered state and community acceptance of the clean-up alternatives before reaching the final decision regarding the clean-up plan. The Record of Decision (ROD) details EPA's final clean-up decision.

EPA's selected remedy is outlined below. These alternatives provide the best balance among the alternatives with respect to the nine evaluation criteria EPA used to evaluate each alternative.

- *Water Supply:* To prevent contact with groundwater contamination at residences affected or potentially affected by the Site, EPA has selected **Alternative WS-G-3a, Public Water Supply.**
- *Main Plant Area Soils:* To prevent direct contact with contaminated soils in the Main Plant Area and to reduce the potential for continued migration of these contaminants to the groundwater, EPA has selected **Alternative MPA-S-3, Capping.**
- *Main Plant Area Groundwater:* To reduce the migration of contaminated groundwater from the Main Plant Area, EPA has selected **Alternative MPA-G-6, Groundwater**

Collection, Treatment of Source Area, and Discharge by Reinjection.

- *Former Disposal Area/Mounded Area Soils:* To reduce the potential for continued migration of contaminants in these soils to the groundwater, EPA has selected **Alternative, FDA-S-4, Excavation, Off-Site Thermal Treatment, Disposal at a Hazardous Waste Facility.**
- *Former Disposal Area/Mounded Area Groundwater:* To reduce concentrations of contaminants in groundwater to MCLs, EPA has selected **FDA-G-4, Natural Attenuation .**

Background

Historically, public concern and involvement with the Malvern TCE Superfund Site has been moderate. In the early 1980s, residents became familiar with the Site when the Pennsylvania Department of Environmental Protection (PADEP) discovered soil and groundwater contamination on the property and groundwater contamination in nearby residential water wells.

From 1982 through 1992, residents on Phoenixville Pike and in the Hillbrook Circle development were involved with the Site while Chemclene, the Site's owner and a potentially responsible party (PRP), periodically tested residential water wells and placed carbon filters on wells with trichloroethene (TCE) contamination. Some residents only became aware of the Site and its associated contamination when their wells ran dry and they were required to redrill. According to residents, EPA's RI and community relations activities have increased the community's awareness and understanding of the Site.

EPA began considering the Site under the Superfund remedial program in November 1993. EPA first initiated community relations activities in July 1995. During that month EPA established an information repository at the Chester County Library, issued a fact sheet, and held a public meeting.

EPA's fact sheet provided a brief history of the Malvern Site, an overview of EPA's activities at the Site, and a description of the Site contamination. The fact sheet also announced EPA's first public informational session which was held on July 31, 1995. The purpose of the information session was to inform residents of the contamination at the Site and the status of EPA's activities at the Site. The East Whiteland Township Environmental Advisory Board hosted the meeting and approximately 20 people attended.

In October 1995, EPA issued a second fact sheet which provided background information

on the Site and the status of the groundwater and soil investigations and residential well sampling.

In February and March 1996, EPA conducted community interviews with residents living in the Hillbrook Circle and Aston Woods residential developments. These interviews allowed EPA to speak with residents one-on-one about their concerns and questions regarding the Malvern Site.

In March 1996, EPA issued another fact sheet. This fact sheet announced approval of the sampling plan for the Site, discussed the scheduled soil sampling and its potential impact on the community, announced the preparation of the Community Relations Plan (CRP) for the Malvern Site, and announced the schedule of residential water sampling.

On April 25, 1996, EPA held an information session at the Great Valley High School to respond to concerns and questions residents had raised during the community interviews. EPA officials who attended the meeting included: Linda Dietz, Remedial Project Manager; Jennifer Hubbard, toxicologist; Barbara Rudnick, hydrogeologist; and Carolyn Szumal, Community Involvement Coordinator. In addition, Ron Sloto, a hydrogeologist with the U.S. Geological Survey attended. EPA sent postcards to local residents to invite them to the information session.

EPA issued the CRP for the Malvern Site in May 1996. The CRP highlighted issues, concerns, and interests of the community located near the Site and provided background information about the Superfund process and the Site. In addition, the CRP listed EPA's community relations objectives and planned activities intended to encourage public participation in Site activities.

To announce the availability of and to obtain public input on the Proposed Remedial Action Plan (Proposed Plan), EPA held a public comment period from June 23, 1997, through September 2, 1997. During the public comment period, EPA issued a fact sheet and held a public meeting in the Great Valley High School Auditorium on July 16, 1997, to provide residents with information about the Site and the proposed clean-up alternatives. The public meeting also provided an opportunity for residents to ask questions about or comment on the Site and EPA's proposed clean-up alternatives. EPA announced the public meeting, the opening of the public comment period, and the availability of the Proposed Plan in a public notice placed in the *Daily Local News* on June 23, 1997.

The July 1997 fact sheet highlighted EPA's preferred alternatives to cleanup the contamination at the Site, announced the availability of the Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan in the information repository, provided a brief history of the Site, invited the public to comment on the documents in the information repository, and

announced the public meeting.

To announce the extension of the public comment period to September 2, 1997, EPA placed a public notice in the *Daily Local News* on July 28, 1997.

Part I: Summary of Commentors' Major Issues and Concerns During the Public Meeting

This section provides a summary of commentors' major issues and concerns and EPA's responses to those issues and concerns. "Commentors" may include local homeowners, businesses, the municipality, and PRPs. The major issues and concerns about the proposed clean-up alternatives for the Malvern Site received during the public meeting on July 16, 1997, and during the public comment period, are grouped into the following categories:

- A. Operations at the Site
- B. The Preferred Soil Alternatives
- C. The Preferred groundwater Alternatives
- D. The Preferred Water Supply Alternative
- E. Bioremediation
- F. Responsibilities of the PRPs
- G. The Time Frame for the Remedial Action
- H. The Site's Impact on the Surrounding Community
- I. The Contamination

A. Operations at the Site

1. Why didn't EPA or PADEP take action against Chemclene for so many years even though both agencies knew there were problems in 1980?

EPA Response: During the early 1980s, Chemclene assumed responsibility for investigating and cleaning up the contamination at the Site. Chemclene provided carbon filters for the affected residents, performed drum removal activities at the Former Disposal Area and removed contaminated soil at the Former Disposal Area. The majority of this work was performed with the oversight of Pennsylvania Department of Environmental Resources. In 1987, EPA took an administrative enforcement action pursuant to the Resource Conservation and Recovery Act (RCRA) against Chemclene and entered into a Corrective Action Order with Chemclene. The Corrective Action Order required Chemclene to investigate and remediate contamination at the Site. Chemclene failed to implement the requirements of the RCRA Corrective Action Order and began considering the Site under the Superfund remedial program in November 1993.

2. Several commentors expressed their disapproval that Chemclene was allowed to operate for so many years even though Chemclene mishandled chemicals, creating a hazard for area residents. The commentors felt that Chemclene should not be permitted to stay in business.

EPA Response: See Response to Part I, A. #7 and Part II, E.#1.

3. A representative from one of the PRPs inquired how his company could be sure that something like this would not happen to him again (i.e. be named a PRP at other sites). How could he find out if the vendor to which his company currently transports waste was doing the same things as Chemclene did?

EPA Response: EPA encourages companies to minimize their waste stream instead of creating waste that needs to be disposed of in some manner, and to examine their processes for opportunities to eliminate the creation of waste in the first place. If waste is created, however, to inquire about a disposal or treatment company's environmental record, the public can call the state environmental agency or the appropriate EPA Region to find out what permit(s) the company holds and if that company has been found to be in violation of any environmental regulations. PADEP regularly inspects all companies permitted to accept hazardous waste in Pennsylvania. EPA information is available to the public under the Freedom of Information Act.

4. Who currently regulates Chemclene's operations at the Site?

EPA Response: Chemclene Corporation does not have a hazardous waste treatment, storage, or disposal permit. The current operation is regulated by the East Whiteland Township, Office of the Fire Marshall. Chemclene Corporation holds a Hazardous Operations Permit with the Office of the Fire Marshall and is permitted to store combustible liquids and oxidizers at the facility. The storage of certain amounts of chemicals is subject to the federal Emergency Planning and Community Right to Know Act.

5. Who sets the standards and regulations which the East Whiteland Township Fire Marshall must enforce when regulating Chemclene - EPA, PADEP, or East Whiteland Township?

EPA Response: The Fire Marshall regulates Chemclene Corporation in accordance with the Fire Prevention Code of East Whiteland Township. The Fire Prevention Code is adopted by the East Whiteland Township, Board of Supervisors. During the public meeting a reference was made to the BOCA codes but this was incorrect.

6. What or who occupied the Site before Chemclene started a business there?

EPA Response: According to aerial photography, prior to the beginning of Chemclene's operation in 1952, the area was forested.

7. Why was there no enforcement action taken against Chemclene for so many years and why didn't EPA notify or warn other companies that dealt with Chemclene that there were problems at the facility? Chemclene had all the required EPA licenses.

EPA Response: EPA generally does not warn other companies of environmental problems. Generally, it is up to the generator to ensure the facility they choose for disposal is in compliance. See Response #1 above and Response in Part II, Section E.1 on page 37.

8. When was Chemclene's hazardous waste permit revoked ?

EPA Response: Chemclene withdrew its hazardous waste permit (Part B permit) in July 1992. This response is corrected from that given at the public meeting where it was stated that Chemclene's hazardous waste operations ended in mid-1993.

B. The Preferred Soil Alternatives

1. If EPA excavated the soil from the Former Disposal Area and transported it to the Main Plant Area, what would the pile look like? How high would the pile be? What kind of vegetation would be placed over the soil?

EPA Response: Although the details for this alternative would be part of the detailed design, the mound of soil probably would be between 10 and 20 feet high, the mound would be capped, and the final surface of the cap would be a grass cover. However, the steepness of the mound would affect the type of vegetation that could grow. The type of vegetation could have been specified in the Record of Decision. Before the soil is moved to the Main Plant Area, preparation of the Main Plant Area would be required, therefore, the collapsed quonset hut would be removed.

2. A representative of one of the PRPs and several area residents expressed formal opposition to the preferred alternative for the Former Disposal Area soils (FDA-S-8). Residents suggested the soil be left at the Former Disposal Area and treated or excavated and taken offSite.

EPA Response: As a result of public comment, EPA has reconsidered the Proposed

Remedy and has made a modification. The remedy selected for the Former Disposal Area soils is FDA-S-4, Excavation and OffSite Treatment and Disposal. See page 60 of the Selected Remedy.

3. Will there be deed restrictions associated with the cap at the Main Plant Area and these restrictions also apply to the Former Disposal Area if EPA chose the cap alternative at the Former Disposal Area?

EPA Response: Yes, if a cap is placed over portions of the Site, EPA will place deed restrictions on the property to prevent any use that would adversely impact the capped area.

EPA would like to clarify the response given at the public meeting with respect to the restriction of the current business and implementation of a cap remedy. If the only remedy available to EPA restricted the current business operation, EPA would still have the authority to proceed. However, if an equally protective, cost effective remedy is available that would allow a business to continue operation then EPA's policy would be to look favorably on that alternative and consider it strongly for selection.

4. What will EPA do to maintain the cap and how long will EPA maintain the cap?

EPA Response: The purpose of the cap at the Main Plant Area is to reduce infiltration of precipitation through contaminated soil. Since contaminated soil will be left in place, EPA has incorporated 30 years of cap operation and maintenance (O&M) into the preferred clean-up alternatives at the Main Plant Area. The O&M is the responsibility of the party undertaking the remedial action which in this case will be either the responsible parties or EPA. If EPA were to perform the remedial action then EPA would enter into a Superfund State Contract with the Commonwealth of Pennsylvania to perform the Operation and Maintenance activities at the Site. The Site would be evaluated every five years by the responsible parties or EPA. If, after 30 years, EPA believes that the remedy has remained and will remain protective of human health and the environment, the site can be deleted from the National Priorities List. EPA believes there is a possibility that the operation and maintenance at the Main Plant Area could last longer than 30 years due to the suspected presence of dense non-aqueous phase liquids in the groundwater.

5. A resident commented that she has read articles which stated that a downside of the alternatives under consideration is the release of hazardous vapors in the air. The resident asked if EPA could promise that no such air pollution will occur with soil movement, pumps and wells.

EPA Response: Release of vapors during soil excavation activities may occur and these releases were considered in the evaluation of alternatives. However, air monitoring will be performed during the remedial action to ensure that the residents and Site workers performing the soil excavations are not exposed to unacceptable levels of contaminant vapors. Additionally, during the RI, air monitoring was performed during drilling activities and there was no indication of unacceptable levels of contaminant vapors. With respect to the groundwater treatment system, the air stripper exhaust will be treated using activated carbon adsorption or U/V oxidation. If responsible parties install the wells, they will need to work to resolve access matters.

6. If EPA proposes to excavate the soil at the Former Disposal Area and move it to the Main Plant Area Corrective Action Management Unit (CAMU), why not treat it once it is moved?

EPA Response: EPA did consider the ex-situ treatment of the Former Disposal Area soils in the vicinity of the residences. However, EPA did not believe that the onSite treatment alternatives provided the best balance among the evaluation criteria. In addition, EPA considered treating the soils in-situ once they were placed back onto the ground at the Main Plant CAMU. Even with a CAMU designation, more stringent State environmental regulations could impact the placement of the soils after onSite treatment. The contaminants in the soil are listed hazardous wastes, therefore, the soil must be handled as a hazardous waste and certain stringent State and Federal regulations apply to the treatment and land disposal of the treated soil. Therefore even after treatment the soil may still require offSite disposal if certain treatment levels are not achieved. EPA did not see the benefit in treating the soil on-Site and possibly be required to still dispose off-Site. However, EPA has reconsidered moving the Former Disposal Area soils to the Main Plant CAMU and instead has selected Alternative FDA-S-4, Excavation, OffSite Treatment and Disposal.

7. A resident suggested that EPA further evaluate placing a cap over the contaminated soil at the Former Disposal Area rather than excavating it and moving it to the Main Plant Area.

EPA Response: EPA evaluated the use of a cap at the Former Disposal Area in the FS and believes the cap alternative does not provide the best balance of the evaluation criteria. However, EPA has reconsidered moving the Former Disposal Area soils to the Main Plant Area CAMU. See Response above.

C. The Preferred groundwater Alternatives

1. If Catanach Quarry closed, would the groundwater flow change?

EPA Response: *The groundwater flow at the Main Plant Area is affected by pumping at the Catanach and Cedar Hollow quarries. If both quarries ceased pumping, the natural flow direction would be to the south.*

2. Why is EPA proposing to reinject the treated water into the ground rather than discharging the water?

EPA Response: *EPA believes that reinjection of treated groundwater into the aquifer is the most appropriate discharge method at this Site since it lies in the Valley Creek watershed. The Valley Creek has been designated an Exceptional Value Stream by Pennsylvania and EPA prefers not to discharge to Valley Creek in this case. EPA would like to clarify the response given at the public meeting regarding discharge to Valley Creek. Although EPA has selected reinjection for the Malvern Site, if EPA determined that other discharge options were not available or effective, EPA could opt to discharge to Valley Creek.*

3. To where will EPA reinject the water after it has been treated?

EPA Response: *EPA will reinject treated water from the Main Plant Area into injection wells located on property owned by East Whiteland Township east of the Main Plant Area and west of Phoenixville Pike. Since EPA has selected Natural Attenuation at the Former Disposal Area, reinjection of water will not be required.*

4. Is the land on which EPA proposes to place the reinjection wells, and which EPA stated was owned by East Whiteland Township, the same land located along Phoenixville Pike that is deeded as recreational land for the Aston Woods Development?

EPA Response: *The parcel of land where EPA proposes to place the reinjection wells runs along the fence line of the Main Plant Area adjacent to Phoenixville Pike. The area currently is wooded and several monitoring wells are located on the property. EPA has been coordinating with East Whiteland Township Board of Supervisors who have commented on the use of the land for placement of injection wells.*

5. Is EPA required to obtain permission from East Whiteland Township to install the reinjection wells on the township's property?

EPA Response: *Because of overriding federal authority, strictly EPA is not required to do this. However, EPA plans to work cooperatively with the East Whiteland Township*

Board of Supervisors to obtain their consent for access for the installation of the reinjection wells. EPA incorrectly responded at the public meeting that permission from the East Whiteland Township Board of Supervisors would be required, because our policies generally encourage us to work out access issues in a cooperative spirit with other government agencies. If responsible parties install the wells, they will need to work to resolve access matters.

6. How will EPA get approval from the East Whiteland Township Board of Supervisors to install the reinjection wells on the township's property?

EPA Response: As clarified above, it is EPA's practice to coordinate such access issues with property owners. EPA coordinated access with the Township for the installation of monitoring wells for the RI activities. EPA has received the Township's comments on the Proposed Plan and use of the property. See Part II, Section B.

7. At what concentration of contaminants will EPA turn off the groundwater pump-and-treat system at the Former Disposal Area?

EPA Response: EPA has made a modification from the Proposed Remedy at the Former Disposal Area from FDA-G-6 (Groundwater Collection and Treatment of Source Well) to FDA-G-4 (Natural Attenuation). Therefore, although the selected remedy at the Former Disposal Area is not an active pump and treat system, the remediation through natural attenuation will continue until the groundwater reaches drinking water standards (i.e. MCLs).

8. What is the cost per ton of removing and treating the contaminants which the pump-and-treat system will remove from the groundwater?

EPA Response: EPA does not have a estimate of cost per ton. EPA has tried to provide an estimate of the cost per gallon using the cost estimate of Alternative MPA-G-6 provided in Appendix C of the FS. However, it is very difficult to estimate the volume of water that will require treatment since the plume at the Main Plant Area may not be clearly defined.

9. Once the pump-and-treat system is started, what will be done to replace the water being removed from the aquifer? What prevents water from the surrounding areas from getting into the pump-and-treat system?

EPA Response: 1) The water being removed from the aquifer will be treated and reinjected. 2) The objective of pump and treat is to draw contaminated groundwater

towards a well where it is extracted for treatment. The extent of the capture zone is related to the pumping rate within the well. This rate can be adjusted to minimize capture of uncontaminated water.

10. Did EPA consider constructing a physical barrier to prevent the contaminated water from migrating?

EPA Response: *Barrier technology is applied to shallow unconsolidated material which is not the case at this Site. The Malvern Site is located in complex bedrock geology and barrier technology is inappropriate.*

11. A representative from the law firm of Drinker, Biddle, and Reath expressed his firm's formal opposition to the preferred groundwater alternatives for the Former Disposal Area and Main Plant Area.

EPA Response: *EPA has considered this comment in the final remedy selection. See Part II, Section, #2 of this Responsiveness Summary.*

12. Why is EPA proposing to treat the groundwater at the Former Disposal Area if EPA also claims the water cannot be contained? Why spend the money to pump and treat the water to remove only a portion of the contamination?

EPA Response: *EPA proposed to pump the source area in the central portion of the groundwater plume in an effort to reduce contaminant mass remaining in the aquifer and to expedite the cleanup. However, EPA has reconsidered the proposed cleanup of the Former Disposal Area groundwater and has selected Natural Attenuation of the groundwater at the Former Disposal Area. See Part II, Section C, #2 of this Responsiveness Summary.*

13. Who currently uses the water flowing from the Site and who could possibly use it in the future?

EPA Response: *Currently, residents who live in Hillbrook Circle and residents living along Conestoga Road and Phoenixville Pike use water that flows from the Site. Future residents who build homes and drill wells in the affected area could be impacted.*

14. Instead of installing the reinjection wells on the township's property, could EPA install the wells on the Balderston property?

EPA Response: *EPA considered installing the reinjection wells in an upgradient location*

on the Balderston property when evaluating the alternatives in the FS. However, groundwater modeling in the FS indicates that if reinjection wells are placed on the downgradient end of the contaminant plume on the township property, the reinjected water will act as a hydraulic barrier and reduce the potential of plume migration.

15. A resident expressed his formal support for EPA's preferred alternatives to cleanup the Malvern Site. He particularly supported the collection, treatment, and discharge of the groundwater.

EPA Response: *EPA has considered the comment in the final remedy selection. EPA has endeavored to select a remedy that is acceptable to the community.*

D. The Preferred Water Supply Alternative

1. Will EPA connect all residents along Phoenixville Pike to public water?

EPA Response: *The final selected remedy requires the connection of all impacted or potentially impacted residences to the public water supply. This includes residences along Phoenixville Pike that are currently part of the Domestic Well Management Plan. See Table 14 of the ROD.*

2. Which homes on Hillbrook Circle would EPA connect to public water?

EPA Response: *The final selected remedy requires the connection of all impacted or potentially impacted residences to the public water supply. This includes all residences on Hillbrook Circle that are currently part of the Domestic Well Management Plan. For a complete list of residents, see Table XX of the ROD.*

3. How will EPA be able to monitor the movement of contaminants if the wells around Hillbrook Circle are abandoned?

EPA Response: *The domestic wells in Hillbrook Circle are not specifically designed or constructed for monitoring purposes. Therefore, the abandonment of these wells will not impact the monitoring of the groundwater plume. A monitoring system, which will include the installation of new monitoring wells, will be installed to monitor the groundwater.*

4. Will Philadelphia Suburban Water Company have rights to the aquifer?

EPA Response: *Water use rights issues are generally beyond the scope of EPA's*

activities. With regard to the Malvern Site, however, EPA's remedy specifically prohibits use of contaminated groundwater by anyone, in order to protect public health. EPA can lift this restriction after the aquifer is remediated.

5. A representative from the law firm of Drinker, Biddle, and Reath expressed his firm's formal approval of EPA's preferred water supply alternative. His firm believes that the key clean-up issue is preventing residents from drinking the water.

EPA Response: EPA has considered this comment and has selected the provision of a public water supply in the final remedy selection. EPA has also selected institutional controls to prevent use of contaminated groundwater.

6. Why is EPA proposing to spend money to cleanup the groundwater if EPA also proposes to connect residents to the public water supply?

EPA Response: EPA is continually faced with the challenge of ensuring adequate and safe drinking water supplies, now and in the future. "Writing off" existing potential supplies because of chemical contamination increasingly reduces the country's ability to assure adequate, clean supplies over time. Several federal requirements therefore apply to this important water resource. The National Contingency Plan (NCP) at 40 C.F.R. Section 300.430 requires that groundwater be restored to its beneficial use, which at the Malvern TCE Site is a current drinking water supply. Also, the Selected Remedy must meet all ARARs, which require remediation of groundwater to MCLs.

7. How can residents be sure that the public water will be of better quality than the well water they currently drink? Will the water be tested?

EPA Response: The responsibility for ensuring the quality of the drinking water rests with the water provider, Philadelphia Suburban Water Company. The water provider is required to monitor the public water supply to ensure that the supply is in accordance with the federal Safe Drinking Water Act (SDWA), 42 U.S.C. §§ 300f to 300j-26. The Act establishes enforceable, health-based drinking water standards.

8. A resident expressed his appreciation for EPA's response to the situation. This resident also was concerned about miscommunications that occurred since EPA knew about contamination in residential wells during the 1980s. The only reason he found out that his well was contaminated was because his well went dry in 1991 and he had to have his new well water tested.

EPA Response: EPA understands the resident's concern and will try to alleviate this

problem in the future. Since EPA's Office of Superfund Programs assumed the remedial activities at the Site, there has been an extensive outreach to the surrounding residents. EPA will continue this outreach through the completion of the remedial activities.

9. A representative from one of the PRPs suggested that the Malvern Site is an appropriate site to use PADEP's new Act II Program and Site Specific Remedies.

EPA Response: *EPA has considered the applicability of the Land Recycling and Environmental Remediation Standards Act ("Act 2") to the Selected Remedy at the Malvern Site. However, EPA does not believe Act 2 to be an ARAR for the Selected Remedy. EPA will continue to work with PADEP in implementing an appropriate cleanup at the Site.*

10. Will EPA pay for the expense of connecting Hillbrook Circle residents to the public water supply?

EPA Response: *The cost of connecting Hillbrook Circle residences to the public water supply will be addressed by the Selected Remedy which as required by CERCLA is the responsibility of the Responsible Parties. The residents will be responsible for water usage.*

11. If residences are connected to the public water supply, will EPA dispose of the contaminated filters currently in place?

EPA Response: *The disposal of the filtration units and filters is a performance standard of the Selected Remedy, and will be conducted by either the PRPs or EPA. See page 53 of the ROD.*

12. A resident inquired why some of the homes near the Site did not have filtration systems installed on their wells. This resident did not have one and requested that EPA place a filter on his well until his home is connected to the public water supply.

EPA Response: *EPA monitors well data for all homes in the Domestic Well Management Plan on an annual basis and some homes on a bi-annual basis. The only homes that are currently on filters are those that are above MCLs, levels that have been established by the Safe Drinking Water Act. Homes that have not been placed filters have not had an exceedance of an MCL for the contaminants of concern.*

E. Bioremediation

1. Why hasn't EPA considered using bioremediation and air injection to cleanup the contaminated soil?

EPA Response: EPA did consider both bioremediation and air injection for remediating soils at both the Main Plant Area and the Former Disposal Area. Various technologies screened for the soils at the Former Disposal Area and Main Plant can be found in Tables 3-2 and 3-4 of the FS. At both locations, bioremediation of soils was rejected as a technology because the aerobic biodegradation of chlorinated compounds has not been found to be effective. Air injection was considered under the description of Soil Vapor Extraction (SVE). In this process, the volatile organic compounds are volatilized by forcing air through the subsurface and removing the air for treatment. Although SVE at both the Former Disposal Area and Main Plant Area was retained as a cleanup alternative, EPA believes the FDA-S-4, Excavation, OffSite Treatment and Disposal of Soils and MPA-S-3, Capping Soils at the Main Plant, provide the best balance among the nine criteria.

2. A resident noted that she had read some articles in the *Philadelphia Inquirer* and the *New York Times* about bioremediation. She inquired if EPA had considered using that technology to cleanup the contamination at the Site or combining it with another clean-up method.

EPA Response: EPA considered bioremediation early in the Feasibility Study (FS) as discussed above including consideration of technical studies, however, EPA did not specifically evaluate the articles the resident referenced.

F. Responsibilities of the PRPs

1. Will the PRPs be responsible for providing the money for the cleanup as soon as the ROD is issued?

EPA Response: Once EPA selects the final clean-up plan, EPA will initiate negotiations with the PRPs to conduct the clean-up activities which consists of design of the remedy, then implementation, followed by long-term operation and maintenance. These negotiations typically take several months.

2. How often do PRPs cooperate with EPA?

EPA Response: PRPs often cooperate with EPA and conduct the necessary activities to cleanup a hazardous waste site. EPA estimates that PRPs conduct the remedial activities at approximately 70% of the Superfund Sites.

3. If Chemclene had liability insurance to cover the costs of cleaning up the site, would the generator PRPs also be responsible for the clean-up costs?

EPA Response: *If Chemclene had liability insurance to cover the cost of the cleanup, the owner could attempt to access this to perform the remediation at this Site. However, under law, most PRPs are jointly and severally liable for cleanup costs.*

4. Has EPA investigated Chemclene's insurance records from the year the company began operations to determine if there is insurance coverage that could be used to pay for the cleanup?

EPA Response: *EPA is currently conducting an extensive investigation of all of Chemclene's financial records.*

G. The Time Frame for the Remedial Action

1. While the question of who will pay for or conduct the cleanup is being resolved, will further clean-up actions stop?

EPA Response: *The formal settlement process and a 120 day moratorium on further EPA actions begin with the issuance of special notice letters to the PRPs. Special notice letters are authorized by CERCLA when EPA determines that a period of negotiation would facilitate an agreement with PRPs for taking a response action. Once special notice letters are issued, a 60-day moratorium period is required. This allows the PRPs that time to submit a good faith offer to perform the work. If such an offer is received, the moratorium is extended an additional 60 days.*

2. If the issue of funding the cleanup goes to litigation, will the cleanup wait until the court battle is settled?

EPA Response: *No. If the PRPs do not present a good faith offer to EPA within 60 days after the issuance of the special notice letters, EPA has the enforcement option to require the PRPs to fund the cleanup, or EPA may start the clean-up process using Superfund money. If EPA uses money from the Superfund to fund the cleanup, EPA may recover those costs later through litigation.*

3. When will EPA make a decision about the final clean-up plan and when will the actual cleanup be started?

EPA Response: *The public was requested to submit comments and questions about the*

Proposed Plan to EPA by September 2, 1997. EPA has considered all comments and questions in the selection of the final remedy. With issuance of the ROD, EPA will begin negotiations with the PRPs regarding who will conduct or pay for the cleanup. The negotiations could take several months. It is likely that the design of the remedy will begin in late 1998 and construction may begin in late 1999.

H. The Site's Impact on the Surrounding Community

1. If the property were no longer used and institutional controls were in place, would those facts significantly change the risk of human exposure to contaminants?

EPA Response: *Yes. Although highly unlikely, if the Chemcene property no longer were used and institutional controls were in place, there would be no exposure to contaminants and therefore no risk. However, contaminants would remain, potentially causing future problems. Institutional Controls would include prohibiting use of groundwater throughout the entire area of the plume. This will be a challenge to fully enforce.*

2. Does contamination from the Site impact Valley Creek?

EPA Response: *EPA has sampled surface water on the Site and in Valley Creek and has determined that contaminants from the Site surface water have not impacted surface water in Valley Creek.*

3. A pipe designed to collect storm water and run-off from Phoenixville Pike is being installed in the Charlestown Oaks Townhouse Development above the Aston Woods Development. The pipe discharges to Valley Creek. If contaminated water were picked up in the pipe, would it be discharged into Valley Creek?

EPA Response: *See Response H.2 above.*

4. How much of the clean-up activities will be visible from Phoenixville Pike and the Aston Woods Development? What will the clean-up activities look like and how long will they last?

EPA Response: *The exact details of the clean-up activities will be determined in the remedial design. However, it is quite possible that some cleanup activities will be visible from Phoenixville Pike and Aston Woods. EPA estimates that construction could take up to two years.*

5. What would the risk be to human health if EPA only connected residences to public water, placed deed restrictions on the property, and fenced and capped the area?

EPA Response: *If EPA connected residences to the public water supply, placed deed restrictions on the property, and fenced and capped the area, there would be no exposure to contaminants, therefore there would be no current risk to human health. However, contaminants would remain, potentially causing risk to people in the future.*

6. In the past, did the Site contamination impact the high school? Will the site cleanup impact the high school in the future?

EPA Response: *EPA's studies indicate that soil contamination is confined to the Chemclene property and has not impacted the High School. In addition, the High School uses public water supplied by PWSC. Groundwater contamination flows to the northeast from the Main Plant and the High School is located to the southeast. During the RI at the Site, EPA conducted air monitoring which indicated that there were no unacceptable levels of contaminants in the air.*

For future impacts see Response B.7 above.

7. Is there a record of any of the high school students coming into contact with the Site contaminants? This inquiry was based on knowledge that the high school's cross country team used to run across the Chemclene property during practice, biology classes studied nearby wetlands, and children living in Aston Woods crossed the property as a shortcut.

EPA Response: *EPA pointed out that the Former Disposal Area and Main Plant Area previously were and currently are fenced. Therefore, if students crossed the property it was most likely property next to the Site which Mrs. Balderston used to own and which the Springridge Development Corporation currently owns. That property is not contaminated. In addition, the surface soils on the areas of concern at the Site do not pose an unacceptable risk. It is the subsurface soils at the Main Plant Area that pose an unacceptable risk.*

8. Does EPA need the approval of the East Whiteland Township Board of Supervisors to go ahead with the cleanup?

EPA Response: *No. EPA does not need the approval of the East Whiteland Township Board of Supervisors to proceed with the clean-up plan. However, EPA will work cooperatively with the township in the implementation of the Selected Remedy.*

9. Will residents living near the Site be able to sell their homes without suffering a loss?

EPA Response: Residents impacted or potentially impacted by the Site have been identified and will be provided public water. EPA often receives inquiries from real estate agents and explains the facts about the Site to them. However, EPA has no information about whether real estate values near this Superfund Site may have been impacted. Existence of contamination could possibly affect real estate values. EPA plans to ensure cleanup and control of this contamination, thus, over time, benefitting real estate values.

10. Why didn't EPA warn people in the past about the potential risks associated with the Site?

EPA Response: The potential risk to surrounding residents is primarily due to the use of groundwater. The residents using groundwater that have been impacted have been placed on carbon filters to remove contaminants. In addition, routine sampling of potentially impacted residents that are not contaminated has been performed to ensure the condition does not change. EPA has learned that newer residents moving to Hillbrook Circle were not made aware of the groundwater contamination when their homes were purchased. EPA has implemented a Community Relations Plan at the Site and will continue this outreach through the completion of the remedial activities.

11. Has EPA considered using Brownfields as a standard for cleaning up the site?

EPA Response: "Brownfields" is EPA's term for minimally contaminated urban sites on which we seek to encourage redevelopment. The Chemclene property is highly contaminated and thus, is has been listed on the NPL.

12. If EPA does not cleanup the Site, will it threaten Valley Creek?

EPA Response: Yes, it is possible that Valley Creek could be impacted if the Selected Remedy is not implemented.

13. Instead of spending \$14 million for the proposed alternatives, EPA should purchase all the homes affected or potentially affected by the contamination, relocate the homeowners, and declare the area uninhabitable.

EPA Response: The Selected Remedy provides protection of human health and the environment and therefore, there is no need to declare the area uninhabitable.

I. The Contamination

1. How will EPA ensure that the Site will not be contaminated further?

EPA Response: Chemclene is not permitted to accept any hazardous waste at its property. The company has a permit with the East Whiteland Township Fire Marshall to store hazardous materials. The Fire Marshall also periodically inspects the facility. Chemclene is prohibited from treating, storing, or disposing of hazardous wastes on the property. Chemclene's hazardous waste handling practices were the original cause of the contamination.

2. How did EPA determine that a nearby septic tank cleaner was not the cause of the contamination in the southwest corner of Hillbrook Circle?

EPA Response: EPA has responded to this comment below in Part II, Section C, #1.

3. Prior to 1980, was there an analysis conducted of Hillbrook Circle's drinking water?

EPA Response: EPA does not believe that the drinking water around Hillbrook Circle was analyzed prior to 1980.

4. Are there hazardous contaminants in the groundwater at the Site that also are found in the groundwater at the Catanach Quarry?

EPA Response: It is EPA's understanding that TCE has been detected at the Catanach Quarry. However, EPA has not determined that the Malvern Site is the source of this contamination. Further investigation of the extent of the contaminant plume at the Main Plant Area will be conducted during Remedial Design.

Part II: Summary of Commentors' Major Comments and Questions Received in Writing During the Public Comment Period

This section provides technical detail in response to comments or questions on the Malvern Site. EPA received these comments or questions in writing during the public comment period. These comments or questions may have been covered in a more general fashion in Part I of this Responsiveness Summary. The following specific comments are addressed:

- A. Comments of North Industrial Chemicals, Inc.
- B. Comments of East Whiteland Township

- C. Comments of Environmental Resources Management (ERM) on behalf of the Malvern Site Study Group, a PRP group
- D. Comments of David DeWitt on behalf of the Concerned Residents of East Whiteland Township (CREW)
- E. Comments of Fox, Rothschild, O'Brien & Frankel, LLP and Walter B. Satterthwaite Associates Inc. on behalf of the Malvern De Minimis PRP Group
- F. Comments of United States Department of Interior
- G. Comments of Mr. & Mrs. Charles Kocher
- H. Comments of Pennsylvania Environmental Defense Foundation

A. Comments of North Industrial Chemicals, Inc.

In a one-page letter dated July 16, 1997, Jack Hammond, a representative of North Industrial Chemicals Inc., submitted comments to EPA regarding the Malvern TCE Proposed Plan.

- 1. Why did EPA favor Chemclene when considering methods to cleanup the Site contamination? The proposed alternatives work around Chemclene's current operations thereby increasing the cost of the remediation and the risk of additional contamination.

EPA Response: See Response E.6, page 39 of this Responsiveness Summary.

B. Comments of East Whiteland Township

In a one-page letter dated August 15, 1997, J. Donald Reimenschneider, East Whiteland Township Manager, submitted recommendations on behalf of East Whiteland Township regarding EPA's proposed alternatives for the Malvern Site.

- 1. EPA should convey the treated groundwater to the six proposed injection wells on the township property using underground piping.

EPA Response: EPA understands the Township's concern regarding the construction of the injection well system and will work with the Township during Remedial Design to address such concerns.

- 2. EPA should place protective fencing around each of the proposed injection wells.

EPA Response: It is possible to construct flush mount injection wells and therefore,

fencing would not be required. However, these details will be addressed during the Remedial Design and EPA will take the Township's concern under consideration during the design.

3. EPA should be responsible for maintaining the injection wells, including capping and filling them upon decommissioning. Well abandonment must comply with County Health Department regulations.

EPA Response: *The Selected Remedy addresses the issues raised in this comment. Please see page 57, of the ROD.*

4. EPA should provide public water, at EPA's expense, to the Hillbrook Circle residences and other residences whose wells were affected by Chemcene.

EPA Response: *EPA agrees and has selected the Public Water Supply Alternative for the provision of public water. See ROD page 52. Under CERCLA, remedy costs will ultimately be borne by the Responsible Parties, even if the Fund pays for the remedy.*

C. Comments of Environmental Resources Management (ERM) on Behalf of the Malvern Site Study Group, a PRP Group

In a 82-page document dated August 29, 1997, ERM, on behalf of the Malvern Site Study Group, submitted comments on the Proposed Plan and RI/FS for the Malvern Site. The comments and responses are summarized below.

1. EPA incorrectly identified the Malvern Site as the source of contamination for several domestic wells in the southwest corner of Hillbrook Circle. The Former Disposal Area is not the source of the volatile organic compound (VOC) contamination in the area of DW-058. The exact source currently is undefined, but may be related to historical use of chlorinated solvent products to unclog a septic system drain field.

EPA Response: *EPA disagrees and believes the facts show otherwise. Precise delineation of contaminant distribution in this area is difficult due to the reliance on active residential wells of varied construction for monitoring purposes. Contaminant levels in this area are also very low and the relatively flat potentiometric surface compounds the difficulty of defining an exact plume outline. Acceptance of whether Hillbrook Circle development is impacted by one dispersed low level plume or a possible second source of contamination does not affect EPA's selection of a remedial action for domestic wells in the development. Continued use of wells in the development represents the potential for spreading of contamination to previously uncontaminated wells.*

- Therefore, the proposed remedy of connecting all residents in the Hillbrook Circle development, on Phoenixville Pike, and on Conestoga Road to public water supplies still offers the best protection for residents in the area.

ERM's interpretation of the local groundwater flow in the area around the Former Disposal Area appears flawed and incompatible with realistic interpretation of the regional potentiometric surface map developed by USGS. This potentiometric surface map (McManus and Sloto, 1997: Plate 1) indicates that groundwater flows south/southwest from the Former Disposal Area through the Hillbrook Circle development, and then intercepting Valley Creek where potentiometric lines form an acute angle (304 feet NGVDD 1929) north of Conestoga Road. ERM's hypothesis that groundwater flows from the Former Disposal Area to the northeast toward the quarry complex under the flow regime mapped by USGS would require the groundwater flow direction to change greater than 90 degrees after leaving the Former Disposal Area, with flow moving from an area of lower to higher potentiometric head across a well defined groundwater divide. A northeastward flow direction was discussed in the RI report as a transient occurrence coinciding with elevated pumping at the quarries, but not suggested for the potentiometric surface developed by USGS.

2. EPA concluded that natural attenuation processes are reducing contaminant concentrations in the Site groundwater and are inhibiting the migration of Site contaminants. However, EPA failed to incorporate significantly natural attenuation into the Proposed Plan.

EPA Response: EPA did incorporate natural attenuation in the Proposed Plan by proposing FDA-G-6, groundwater extraction and treatment, at the Former Disposal Area. This alternative focused pumping on the source area of the contaminant plume at the Chemclene property and allowed natural attenuation of the plume off the Chemclene property. And, as explained below, EPA has determined Natural Attenuation to be acceptable, provided it can meet required cleanup levels in accordance with Section X. E of the Selection Remedy.

As indicated in the RI Report, CAH's in the contaminant plume emanating from the Former Disposal Area exhibit significantly elevated concentrations of degradation products of TCE, 1,1,1-TCA, and PCE. At several monitor wells, concentrations of degradation products exceed the concentrations of more halogenated and chlorinated CAH's. Additionally, evaluation of historical data indicates that concentrations of CAH's in monitor wells at the Former Disposal Area, and nearby domestic wells have been decreasing with time since the last removal of drums at the mounded area in 1990. With time, the contaminant plume should continue to recede. Modeling of the contaminant

plume using a series of first order equations indicated that contaminant concentrations should decline below MCL's within 16.5 years (CH2M HILL, 1997). Due to the inherent uncertainty associated with modeling it was EPA's initial position that a short term active pump and treat remedy would remove these doubts by expediting natural attenuation process. However, EPA has re-evaluated this approach and has concluded that the overall risk of a natural attenuation remedy at the Former Disposal Area is acceptable if the 52 residential wells around the Site are connected to public water supplies. In addition, these domestic wells need to be abandoned to prevent further exposure to the residents, or converted to monitoring wells. This remedy, like all remedies, can be reevaluated based on measurable performance.

3. EPA did not adequately account for the presence of dense non-aqueous phase liquids (DNAPLs) in groundwater around the Main Plant Area. EPA's proposed remedial action would be technically impractical and ineffective in the presence of DNAPLs. Due to the presence of DNAPLs, EPA will not be able to meet groundwater applicable or relevant and appropriate requirements (ARARs) in the long-term.

EPA Response: EPA disagrees. ERM's presumption that EPA ignored the presence of dense non-aqueous phase liquids (DNAPL's) in selecting a remedial alternative for groundwater at the Main Plant Area is false. Alternative MPA-G-6, Groundwater Collection, Treatment of Source Area, and Discharge, was selected to reduce contaminant mass in the center of the groundwater plume and control migration of contaminants offSite. At the same time, mechanisms of natural attenuation as discussed in the RI Report, will help eliminate contaminants from the peripheral areas of the plume. This approach is clearly stated in the Proposed Plan.

EPA acknowledges that achieving chemical specific ARAR's for groundwater using pump and treat technology in the presence of DNAPL's is difficult and may be technically impracticable. A number of technical issues were considered for the selection of Alternative MPA-G-6. These issues were balanced against the need to protect public health and groundwater supplies. (The NCP mandates that polluted groundwater be restored to beneficial use regardless of whether it is used for current public drinking water supplies.) The selected alternative was intended to reduce the contaminant mass in the most highly contaminated plume area and decrease the extent of the contaminant plume. If it becomes evident that the area of highest contamination can not be remediated to MCLs, this area will be considered for a technical impracticability waiver as discussed in the ROD, page 64. This waiver will only change the cleanup standards for the area where the present standard cannot be met. No design changes to the treatment system would be required. The only practicable change to the system would be

the re-designation of some remedial wells to containment wells.

EPA has selected Alternative MPA-G-6, Groundwater Extraction and Treatment, as the remedial alternative for groundwater at the Main Plant Area because there is no significant design difference between this alternative and one that provides a technical impracticability waiver for the area of highest groundwater contamination. Any future changes to this approach can be made based on remedial action monitoring data. EPA believes this approach recognizes the difficulty of remediating groundwater within the facility boundaries of the Main Plant Area, as well as the benefits of natural attenuation to any active pump and treat design.

4. EPA failed to incorporate the site-specific clean-up levels approach to the conditions at the Site allowed under Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2), despite identifying the Act as an ARAR.

EPA Response: EPA did not identify Act 2 as an ARAR for this Site. The table that ERM is referring to in the FS is entitled preliminary. A final ARARs determination is made as part of the remedy selection. EPA coordinated with PADEP throughout the remedy selection process.

5. EPA did not apply the Technical Impracticability (TI) Guidance for Groundwater for the likely presence of DNAPLs below the water table at the Main Plant Area.

EPA Response: EPA has considered this guidance as discussed above in response #2.

6. EPA did not consider the effects of the presence of DNAPLs on soil remediation properly.

EPA Response: EPA did consider the effects of DNAPLs on soil remediation. The remedial alternative for groundwater was based on a conservative approach in regard to protection of groundwater supplies, consistent with the NCP. This conservative approach considered that the contaminant mass in plume at the Main Plant Area could be reduced while preventing additional downgradient migration of the plume. If DNAPL is present, pumping at the source area will contain its migration and recover a certain volume. Consistent with a conservative approach to groundwater remediation, soil alternatives were developed to prevent additional leaching of contamination to groundwater from the unsaturated soils. As the presence of DNAPL has not been definitively demonstrated. EPA believes remediation of soil either through soil vapor extraction (SVE), soil flushing, or prevention of additional leaching with capping, could aid in the remediation of a dissolved-phase plume by removing the source in the vadose

zone. However, since EPA believes implementation of the cap at the Main Plant Area provides adequate protection of groundwater, EPA has reconsidered the adoption of SVE at the Main Plant Area.

6. EPA did not conduct pilot studies of soil vapor extraction (SVE) to determine if the technology would be effective under specific site conditions.

EPA Response: EPA had planned a Pilot Study for the Fall of 1997 at the Main Plant Area to determine the effectiveness of SVE. However, since EPA has not selected SVE at the Main Plant Area, the Pilot Study was determined to be unnecessary. Instead, EPA will be using MPA-S-3, Capping at the Main Plant Area.

7. EPA did not consider the cost-effectiveness of natural attenuation as a realistic permanent solution for groundwater remediation.

EPA Response: EPA has considered the cost effectiveness of natural attenuation as discussed in Response #2 above. Additionally, EPA has reconsidered the cost effectiveness of natural attenuation (Alternative FDA-G-4) for implementation at the Former Disposal Area in lieu of the pump and treat alternative (FDA-G-6) described in the Proposed Plan. In accordance with the NCP, cost effectiveness is part of the nine evaluation criteria for selecting a remedial alternative. Cost effectiveness is grouped with four other criteria that are known as primary balancing criteria for selecting an alternative. For EPA, the balancing criteria are secondary to the two threshold criteria in selecting an alternative:

1. Overall protection of human health and environment

2. Compliance with Applicable or Relevant and Appropriate Requirements

EPA reconsidered FDA-G-4, Natural Attenuation, because the alternative meets the two threshold criteria at the Former Disposal Area and decided to select it.

However, this is not the case at the Main Plant Area. Cost effectiveness of a natural attenuation alternative (MPA-G-4) over groundwater extraction alternatives (MPA-G-5 and G-6) at the Main Plant Area was not considered appropriate because natural attenuation is not protective of human health and the environment at the Main Plant Area.

Although a number of techniques were performed on analytical data during development of the RI Report, a reasonable mechanism for natural attenuation (anaerobic

degradation, dehalogenation, hydrolysis) could not be definitively identified that explained the attenuation of Chlorinated Aliphatic Hydrocarbons (CAHs) at the Main Plant Area. In light of this uncertainty, and estimations of an extended period for constituents to attenuate below MCLs (35 years), natural attenuation was not considered as a sole alternative for groundwater remediation at the Main Plant Area. Consequently, a cost effectiveness analysis was not warranted.

8. EPA should have concluded that the proposed Main Plant Area groundwater alternatives could violate the remedial action objectives (RAOs) by increasing the plume movement off the property.

EPA Response: EPA disagrees with ERM's interpretation. The remedial action objective is to restore the Site groundwater to a beneficial use through removal and treatment of the contaminated groundwater. The Site is defined as the area impacted groundwater contamination. To achieve this objective, contaminated groundwater will be pumped to extraction wells both on the Chemclene property and off the Chemclene property. This action by definition draws contamination to the extraction wells. The placement of extraction wells on the Chemclene property will be designed to keep the most contaminated groundwater from migrating off the Chemclene property. Off property extraction wells will be designed and placed to as to not adversely impact the purpose of the extraction wells on the Chemclene property.

9. EPA did not evaluate integrated Site-wide alternatives, even though various remedial actions for specific areas or media interrelate and, in some aspects of the Proposed Plan, are redundant for meeting the RAOs.

EPA Response: EPA elected to address the Site in this manner because the Site contains two areas of concern, each with at least five alternatives for soil and groundwater. Integration of Site-wide alternatives results in a large and unruly number of combinations of alternatives for evaluation. In addition, the groundwater and source control alternatives at each area are relatively independent of each other. An evaluation of Site-wide alternatives is not required by the NCP. Such an evaluation at this Site would generate an excessive number of permutations for alternatives, there would not be much value added, and would detract from the clarity of the FS.

The physical characteristics of the Site accommodates a thorough evaluation of alternatives for specific media at each area of concern. The Former Disposal Area and Main Plant Area are separated by 1,900 feet. Although the two areas of concern overlie the same aquifer, the areas appear to be separated by a groundwater divide. Subsequently, integrating remedial elements for both sites such as a common

groundwater or soil vapor treatment plants would be difficult to accomplish without significant costs for conveying media between sites for treatment.

10. EPA did not apply all elements of the Common Sense Initiative to the proposed alternatives.

EPA Response: EPA's decision making at Superfund Sites is guided by the National Contingency Plan. In contrast, the Common Sense Initiative focuses on ongoing pollution reductions in agency regulated business sectors. In any event, EPA endeavors to use common sense in all its decision making.

11. ERM suggested the following remedial actions for the Main Plant Area:
- continue operation of the carbon filters until public water is available;
 - connect one Phoenixville Pike residence and the Main Plant Area to public water;
 - restrict the property to industrial/commercial use;
 - place an asphalt cap over contaminated soils;
 - place institutional controls on the site to prevent future groundwater use at the MPA; and
 - monitor groundwater to ensure that natural attenuation continues to remove contamination and limit the extent of the plume.

EPA Response: EPA has considered ERM's suggestion and although EPA has made modifications from the Proposed Plan, EPA does not believe ERM's suggested remedial actions for the Main Plant Area, in its entirety, provides the best balance of the evaluation criteria.

12. ERM suggested the following remedial actions for the Former Disposal Area:
- continue the operation of carbon filters until public water is available;
 - connect affected residents on Hillbrook Circle to public water;
 - remediate Former Disposal Area soils by either in-situ treatment or excavation/on-site treatment and replacement;
 - monitor the groundwater to ensure that natural attenuation continues to remove contamination and limit the extent of the plume.

EPA Response: EPA has considered ERM's suggestion and although EPA has made modifications from the Proposed Plan, the Agency does not believe ERM's suggested remedial actions for the Former Disposal Area, in its entirety, provides the best balance of the evaluation criteria.

13. Extensive comments were received from ERM regarding the Risk Assessment contained in Section 6 of the Remedial Investigation. ERM identified the following issues as errors of significance:

- ▶ Inclusion of natural background metals as chemicals of potential concern (COPCs)
- ▶ Misidentification of potential receptors and use of unrealistic exposure scenarios
- ▶ Use of historical data maximum concentrations for calculation of future off-site groundwater risks
- ▶ Evaluation of TCE and PCE as carcinogens
- ▶ Evaluation of Class C compounds as carcinogens

These issues are addressed in detail below, referencing the specific sections in which they are discussed in the ERM document which can be found in the Administrative Record for the Site.

EPA disagrees with ERM's conclusions regarding the Risk Assessment and has not made any changes based on these comments. A detailed response is provided below.

EPA Response:

ERM Section 2.4.1.1, Chemicals of Potential Concern

Metals

As ERM suggests, many of the inorganic COPCs detected in site soils and Main Plant Area groundwater can be found naturally in the environment. To address this possibility, current Environmental Protection Agency (EPA) risk assessment policy recommends comparing on-site data to site-specific background data. (Note that when making site-specific decisions regarding the elimination of COPCs, it is inappropriate to compare site data to background ranges from the general literature for the entire Eastern United States, as proposed by ERM). At the Malvern TCE Site, a statistical comparison of Site-related soil and groundwater concentrations to Site-specific background soil and groundwater concentrations was performed, and only the inorganics present at levels statistically above background -- and greater than respective Risk-Based Concentrations (RBCs) -- were retained as COPCs in the risk assessment.

Regarding ERM's comment that several background concentrations used for COPC screening do not correspond to background data reported in the RI, the following point should be noted. In the risk assessment, the maximum detected concentration of each inorganic constituent on-Site was compared to the 95% Upper Tolerance Limit (UTL) for background constituents. The 95% UTL does not necessarily equal any single background detection; rather the 95% UTL provides a statistical representation of the complete background data set.

ERM questions the appropriateness of evaluating iron in the risk assessment, stating that "iron is not even a CERCLA hazardous substance, and is therefore not regulated under Superfund." However, iron is included on the Superfund Target Analyte List. It is current EPA risk assessment policy to evaluate the risks associated with all constituents which are analyzed for and detected at a Site in excess of RBCs. At the Malvern TCE Site, iron falls into this category and was, consequently, carried through the quantitative risk assessment.

In general response to ERM's false claim that naturally-occurring metals in groundwater (and soil) were improperly carried through the risk assessment, it should be noted that the inorganic constituents retained as COPCs in Main Plant Area groundwater do not significantly contribute to the risk associated with groundwater use, as compared to the gross risks posed by organic contaminants. Manganese, the inorganic constituent that contributes the highest noncarcinogenic hazard due to ingestion of groundwater, only contributes 9.3% of the total hazard. Beryllium, the inorganic constituent which contributes the highest carcinogenic risk due to ingestion of groundwater, only contributes 5.1% of the total carcinogenic risk. Therefore, the presence of inorganic constituents in groundwater has no impact what-so-ever on remedial decisions for the Malvern TCE Site.

Similarly, it must also be noted that there were no significant risks or hazards associated with direct exposure to site soils that resulted in a decision to remediate soil. The decision to remediate soil was based solely on the potential leaching of organic contamination from soil to groundwater. The proposed soil remediation methods are intended to address the soil-to-groundwater transport pathway, not direct contact with soil.

Specific comments related to the Former Disposal Area are addressed below:

- Contrary to ERM's claim, background metals were not evaluated on the basis of only one RI sample. All of the background soil samples collected at the Malvern TCE site were combined to calculate respective 95% UTLs for inorganic background constituents. The site-specific 95% UTL background concentration for each inorganic compound was then used to represent the background concentration for both Former Disposal Area and Main Plant Area soils. ERM further suggests that background metal concentrations at the Former Disposal Area were higher than those at the Main Plant Area. This assertion is also incorrect; background metal concentrations at the Former Disposal Area were not higher than at the Main Plant Area for the majority of the constituents which were detected.*
- ERM questions the inclusion of arsenic as a COPC, citing that "16 of the 21 sample results were blank qualified." Arsenic was retained as a COPC because three of the 16 Former Disposal Area samples had detections of arsenic that were not blank qualified. EPA risk assessment guidance (EPA, 1989) states that if all samples contain levels of a given constituent at five times (or 10 times for common laboratory contaminants) the level of*

contamination noted in the blank, then that chemical should be completely eliminated from the set of sample results (Page 5-17, Section 5.5). Since arsenic was not blank-qualified in all of the analyzed samples it was rightfully retained as a COPC in the risk assessment.

- The inclusion of cadmium as a COPC is challenged by ERM since only two of 10 samples contained cadmium in excess of the screening RBC for residential soil. However, cadmium was retained as a COPC because the maximum detected concentration in soil exceeded the background 95% UTL, as well as the RBC. Additionally, contrary to ERM's allegation, the risk assessment does not assume that chronic exposure will occur at only the most contaminated 10% of the soils. All confident detects and nondetects for cadmium at the Main Plant Area and Former Disposal Area are incorporated in the calculation of the exposure concentration.
- ERM asserts that thallium should not have been identified as a COPC in soil since the highest detected concentration (3.1 mg/kg) was "not significantly above the non-detect at the background sample." Per EPA risk assessment policy, thallium was retained as a COPC because it was detected in on-site soil in excess of background, as well as in excess of its RBC.
- ERM contends that even though aluminum was detected at noteworthy levels in soil, it should not have been evaluated in the risk assessment, since it is "one of the most abundant elements in the earth's crust." As was discussed previously, it is current EPA policy to use site-specific background data, rather than background data from the general literature for the entire Eastern United States. Site-specific background data were collected at the Malvern TCE site. The concentration of aluminum detected at the site exceeded the 95% UTL for the site-specific background, as well as its RBC.

Again, for the record, it must be noted that there were no significant carcinogenic risks or noncarcinogenic hazards associated with direct exposure to site soils that resulted in a decision to remediate the soil. The decision to remediate soil was based on the potential leaching of organic constituents from soil to groundwater. The proposed soil remediation methods are intended to address the soil-to-ground water transport pathway, not direct contact with soil. Therefore, ERM's comments on inorganic data handling are irrelevant to the proposed remediation.

Laboratory Artifacts

ERM asserts that detections of bis(2-ethylhexyl)phthalate (DEHP) in UST area surface soil are "laboratory artifacts," citing a blank-qualified detection of 62,000 ug/kg as proof of this claim.

However, DEHP observations that were not blank-qualified are an order of magnitude greater than the samples that were blank-qualified. The blank-qualified detection of DEHP cited by ERM (62,000 µg/kg) actually represents a subsurface soil sample collected during a different sampling event than the confidently detected concentrations used in the risk assessment. Therefore, it is appropriate to assume that DEHP positively detected in surface soil is truly present on-Site and, therefore, eligible for risk-assessment consideration. (Note that DEHP contributed less than one percent of the total carcinogenic risk or noncarcinogenic hazard associated with exposure to UST area surface soil.)

ERM claims that chloroform is a "laboratory artifact" in several domestic wells and, therefore, should not have been evaluated in the risk assessment. Risk of exposure to chloroform was evaluated for several domestic wells because this organic contaminant was not detected in any of the associated blank samples at similar concentrations during the RI sampling event. Similar concentrations of chloroform were considered blank-related for different sampling events on different sampling dates. Additionally, the wells where chloroform was the only COPC did not pose an unacceptable noncarcinogenic hazard or carcinogenic risk to potential receptors.

ERM Section 2.4.1.2, Receptors and Exposure Scenarios

Since the remedy for this Site involves extension of the public water supply, ERM believes evaluating groundwater risks in and around the Site, as was done in the risk assessment, is improper. However, the purpose of a baseline risk assessment is to evaluate current conditions at the Site, under the assumption that no remediation will be implemented, in order to determine the need for action. Presently at the Malvern TCE Site, neighboring residents are not connected to a public water supply and use groundwater as their sole potable source. Further, since groundwater flow is not confined by Site boundaries, future exposure to downgradient receptors can -- and will -- occur if contaminated groundwater is not addressed. Additionally, irrespective of current or potential future use patterns, groundwater is considered by the federal government to be a public asset and, as such, the National Contingency Plan mandates that groundwater be restored to its beneficial use to the extent practicable.

Given the objective of such evaluations, EPA makes a clear distinction between risk assessment and risk management. Using data founded in good science and conforming to EPA's mission of protecting public health and the environment, the risk assessment provides information on the potential threats associated with exposure to Site-related constituents. The risk manager uses this information to determine if clean-up is necessary and, if so, to help decide the best approach for remediation. Therefore, risks associated with potential potable groundwater use at the Malvern TCE Site have been provided in the risk assessment for application to risk management decisions. The technical and engineering issues related to Dense Non-Aqueous Phase Liquids and other remediation matters that could impact clean-up decisions are addressed in the

Feasibility Study by the risk manager, not in the risk assessment by the risk assessor (as requested by ERM).

ERM Section 2.4.1.3, Data Set Used

ERM contends that an incomplete data set for off-site groundwater is provided in the RI report, and that EPA apparently used the highest historical concentration for each COPC to calculate risks from exposure. In response to this assertion, it should be noted that data from the June 1996 residential well sampling event were not available at the time the risk assessment was conducted. Therefore, data from 1995 were used in the assessment of risk. Although residential well sampling was performed on three occasions, no single residential well was sampled more than twice. Since a 95% Upper Confidence Limit can not be calculated from two sampling results, the maximum detection of the two samples was used as the exposure concentration in the risk assessment, per EPA guidance. For many of the wells, only one sample was collected during 1995; in this case, single sample results were used for risk assessment calculations, also in accordance with EPA guidance.

ERM disagrees with the inclusion of 1994 groundwater data for estimating Former Disposal Area risks. However, groundwater data collected from monitoring wells at the Chemclene property in both 1994 and 1996 were used for the assessment of risks at the Chemclene property. Use of the 1994 data, in conjunction with the 1996 results, may have resulted in a conservative risk estimate for the Former Disposal Area groundwater plume. However, use of the 1996 data alone would have also resulted in an unacceptable risk, triggering the need for action.

ERM Section 2.4.1.4, Quantitative Assessment of TCE and PCE

ERM challenges the inclusion of TCE and PCE in the risk assessment for the Malvern TCE Site, since carcinogenic slope factors for these compounds have been withdrawn from the Integrated Risk Information System (IRIS). Note, however, that rather than ignore potential risks posed by Site-related contaminants, it is standard risk assessment practice to use toxicity values which have been withdrawn from IRIS when no other values are available. The EPA National Center for Environmental Assessment (NCEA) recommends the use of the withdrawn slope factors for TCE and PCE as provisional values for risk assessment. Further, according to a June 8, 1993 memo from Cindy Sonich-Mullin (Director, Superfund Health Risk Technical Support Center, Chemical Mixtures Assessment Branch) to Edward Hanlon (U.S. EPA, Region V) on Toxicity Information for Trichloroethylene and Tetrachloroethylene (Fields Brook/OH), TCE and PCE were removed from IRIS in 1989 due to uncertainties in the cancer weight-of-evidence classification, not uncertainties in their carcinogenic slope factors. In addition, the World Health Organization has recently stated that TCE is probably carcinogenic to humans (IARC Monographs, 1995).

For the sake of perspective, it should be noted that TCE only contributes 16.4 % of the inhalation and 12.8% of the ingestion cancer risks associated with potable use of Former Disposal Area groundwater, while at the Main Plant Area, TCE contributes 16.3% and 13.7% of the inhalation and ingestion cancer risks, respectively. PCE contributes an even lower percentage to the total risk associated with Former Disposal Area and Main Plant Area groundwater use. The primary contributor to carcinogenic risks via these exposure routes is 1,1-DCE. In fact, this compound alone poses an unacceptable cancer risk via either route of exposure (inhalation or ingestion), and is sufficient for triggering an action at the Site.

ERM Section 2.4.1.5, Evaluation of Other "Class C" Carcinogens

ERM erroneously interprets EPA's position on the evaluation of potential risks posed by possible human carcinogens, stating that such compounds "have inadequate evidence to be classified as carcinogens." In truth, EPA guidance indicates that slope factors are typically calculated for potential carcinogens in classes A, B1 and B2, and that estimation of slope factors for the chemicals in class C proceeds on a case-by-case basis. Further, EPA risk assessment guidance (USEPA, 1989) states that "slope factors for all potential carcinogens having a weight-of-evidence classification of A, B, or C should be sought" (Page 7-16, Section 7.4.3). Since slope factors are available for the class C carcinogens selected as COPCs in the Malvern TCE risk assessment, potential cancer threats presented by these contaminants were quantitatively evaluated in the risk assessment, as dictated by EPA guidance.

Further, EPA's proposed carcinogenic risk assessment guidelines (April 1996) discuss eliminating the use of weight-of-evidence classifications. If finalized in its current form, all class A, B and C carcinogens will be categorized into one group. Under this scheme, these constituents would still be evaluated for carcinogenic risks.

ERM Section 2.4.2.2, Contaminants of Potential Concern

In ERM's re-evaluation of risk at the Malvern TCE site, several "metals" were removed from consideration by "proper comparison" of concentrations to background levels, including "benz(a)fluoranthene and benzo(a)pyrene". Please note that neither benzo(a)fluoranthene nor benzo(a)pyrene are metals. Rather, these chemicals are semi-volatile organic compounds.

ERM Section 2.4.2.3, Reassessment of Site Risks

Completely dismissing all other contaminants at the Site, ERM calculated carcinogenic risks related only to vinyl chloride exposure. (Vinyl chloride is the only class A carcinogen detected at the Malvern TCE Site.) According to EPA risk assessment policy, it is improper to eliminate

class B2 (or C) carcinogens from the calculation of carcinogenic risk, for reasons cited above. EPA has conducted the Risk Assessment in accordance with good science, established science and guidance, and with the important responsibility of protection of public health.

D. Comments of David DeWitt on behalf of the Concerned Residents of East Whiteland Township (CREW)

In a seven-page letter dated August 20, 1997, David DeWitt, President of CREW, submitted comments and questions on behalf of the group about EPA's proposed alternatives to cleanup the Malvern Site.

1. CREW is interested in the Community-Based Remedy Selection Process, part of the Superfund Administrative Reforms announced by Carol Browner, EPA Administrator, on October 2, 1995. CREW would like to be involved actively in all aspects of remedy selection and implementation. EPA proposed alternatives could make the community worse off than it is now if they are implemented. The alternatives should not put the interests of Chemclene before the interests and concerns of the community.

EPA Response: The Community-Based Remedy Selection Process Administrative Reform announced by Carol Browner is a pilot reform in which EPA, Region III did not participate. However, EPA intends to work closely with CREW in the implementation of the remedy to ensure the community's concerns are addressed during the Remedial Design. EPA understands the concerns that CREW may have with respect to remedy implementation but EPA is required by the NCP to protect public health in the selection of a remedy.

2. All structures, treatment units, etc., such as SVE wells and groundwater treatment units, should be located as far from residences as possible. Remedial activities and equipment should not be visible from Phoenixville Pike or Aston Road. All remedial activities should be carried out to minimize noise, dust, air emissions, odors, etc. in the area. Large equipment should be located inside buildings to minimize aesthetic and noise issues.

EPA Response: EPA understands the concerns of CREW and is committed to working with the community to address these concerns during the Remedial Design phase.

3. The developers of Aston Woods deeded the property bordered by Aston Road and Phoenixville Pike to East Whiteland Township as recreational land for the benefit of Aston Woods. This property should not be used for long-term remedial activities.

EPA Response: EPA understands the concerns of CREW but would like to reiterate that it

may be necessary to use this property for long-term remedial activities. However, EPA is committed to working with the community and will consider their concerns in the Remedial Design phase.

4. EPA should place a RCRA cap over all areas where soil contamination is above relevant clean-up criteria. A RCRA cap is the only containment alternative that will minimize infiltration and prevent on-Site exposure during the O&M period and it is more protective of human health and the environment. The final remedy in the ROD should be contingent so that the parties carrying out the remedy have the option of implementing a RCRA cap.

EPA Response: The Selected Remedy for the cap construction at the Main Plant Area is performance based. This requires the cap to be constructed with the permeability equivalent to that of a RCRA cap. The performance standards for implementation of the cap are outlined on page 54 of the ROD.

5. EPA should eliminate the option of transporting contaminated soils from the Former Disposal Area to the Main Plant Area because the movement could create uncontrolled air emissions of the contaminants in the soil. These soils either should be capped near the Former Disposal Area, but remote from homes, or transported off-Site. In addition, it is unfair and technically unwarranted to transport contaminated soil to create a containment cell 20- to 30-feet high directly behind homes.

EPA Response: EPA agrees that the contaminated soils at the Former Disposal Area should be transported offSite for treatment and disposal, and has provided for this in the Selected Remedy.

6. The SVE unit should treat off gases if detectable concentrations of site contaminants will be present in the off gases. There should be no injection of air or other vapors as part of the SVE since this may disturb subsurface air vapors unpredictably.

EPA Response: EPA has reconsidered the use of SVE at the Main Plant Area and has not selected SVE in the ROD.

7. EPA did not establish the technical feasibility of SVE. EPA should conduct pilot testing to ensure the technology is effective and appropriate. If SVE is implemented, the SVE well shown in the FS on or near the property line should be moved to another location.

EPA Response: EPA had planned a Pilot Study to determine the effectiveness of SVE but since it is not part of the Selected Remedy, EPA will not conduct a Pilot Study.

8. EPA has not given sufficient consideration to a natural attenuation groundwater remedy at the Main Plant Area. A groundwater pump-and-treat system will create a disturbance for the neighborhood and potentially can create an exposure pathway. EPA's scenario of an industrial worker at the Site drinking the water is not sufficient justification to pump and treat the groundwater since deed restrictions would eliminate this risk.

EPA Response: EPA disagrees. This comment is further addressed in Section C, #2 of this Responsiveness Summary. However, EPA did select Natural Attenuation at the Former Disposal Area.

9. If EPA implements a groundwater pump-and-treat system, the air stripper and all vapor-phase treatments must be located inside a building. The building should be noise proof and the system must have a noise arrester.

EPA Response: EPA understands the concerns of CREW and is committed to working with the community to address these concerns during the Remedial Design phase.

10. The groundwater treatment system should be located in the area identified as the proposed spray irrigation location. The system should not be located in close proximity to homes or directly across from Great Valley High School. CREW believes it impractical to have two separate groundwater treatment systems. If there is a treatment system for the Main Plant Area groundwater, there should be one consolidated system for the Main Plant Area and Former Disposal Area located away from homes. The inlet from the Former Disposal Area can be shut off after five years.

EPA Response: EPA has made a modification to the Proposed Remedy and has selected FDA-G-4, Natural Attenuation, for the Former Disposal Area groundwater. Therefore, it will not be necessary to construct a treatment system for the Former Disposal Area. EPA understands CREW's concern regarding the construction of a treatment system in the vicinity of the Main Plant and is committed to working with the community during the Remedial Design phase to address these concerns.

11. CREW strongly objects to the spray irrigation option for treated groundwater since it is likely to cause nuisance conditions from water spray drifting to homes, roads, etc., particularly in winter months when icing is a concern.

EPA Response: EPA has not selected Spray Irrigation for the discharge of treated groundwater.

12. EPA guidance states that treatment of DNAPLs is presumed to be technically infeasible and EPA is entitled to receive a technical impracticability (TI) waiver unless written justification to the contrary is provided. The proposed treatment will subject residences to greater pumping and extraction volumes and the extraction, handling, packaging, and transportation of listed hazardous wastes. CREW suggests selecting Alternative MPA-G-5 (Ground Water Collection, Treatment, and Discharge), and pumping and extraction rates should be determined based on a containment objective.

EPA Response: EPA has considered this issue in Section C, #2 of this Responsiveness Summary.

E. Comments of Fox, Rothschild, O'Brien & Frankel, LLP and Walter B. Satterthwaite Associates Inc. on behalf of the Malvern De Minimis PRP Group

In a 17-page letter dated September 2, 1997, Fox, Rothschild, O'Brien & Frankel, LLP and Walter B. Satterthwaite Associates Inc., on behalf of the Malvern De Minimis PRP Group, submitted comments to EPA regarding the Proposed Plan.

1. The Malvern Site is a former RCRA facility and should be closed in accordance with RCRA guidelines. The Proposed Plan did not address normal RCRA closure issues which would eliminate any possible risk to human health for on-Site employees and future residents. Tailoring the clean-up plan to allow Chemclene to continue operating violates RCRA regulations.

EPA Response:

The Selected Remedy addresses the closure of the regulated units (i.e. quonset hut and main building) that were never closed by Chemclene. Closure of the regulated units will not address the risk posed by soil and groundwater and EPA has deferred the remediation of the soil and groundwater to the Superfund program.

The remedy as established in the ROD will achieve all of the standards for closure under RCRA, even though the closure is done as part of a CERCLA cleanup. However, closure of a facility under RCRA does not require sealing off all access to the facility on which the RCRA units were located. It is not inconsistent with RCRA to allow Chemclene's continued use of the Site for activities which do not require a RCRA permit.

The commentor in effect argues that there will be less risk of exposure to Chemclene workers if they are barred from the entire Site. Certainly there would be less theoretical risk at any Superfund site if a huge fence were constructed and all access to the site was

forever forbidden. However, the purpose of CERCLA is to cleanup contaminated sites, not merely to reduce risk by restricting access. The cleanup of a Superfund site is to be designed, to the maximum extent practicable, to allow the continued or future use of the site and its resources.

2. EPA has ignored Land Use Guidance by allowing Chemclene to continue operating and in assuming residential use in the human health risk analysis. The guidance requires discussion with local land use authorities and other locally affected parties, review of anticipated future land use or uses, and zoning and analysis of site activities consistent with possible future land use.

EPA Response: EPA has not ignored the Land Use Guidance and has consulted with East Whiteland Township. The property is currently zoned residential and Chemclene currently operates a lawful nonconforming commercial facility from the property. This in effect means that the facility was in operation prior to the zoning and may continue to operate as such. It is clear from the zoning that the local land use authorities anticipate that the future land use could be a residential property.

3. EPA's policy is to defer facilities that may be eligible for inclusion in the Superfund program to the RCRA program if the sites are subject to RCRA corrective action. There are exceptions to this deferral, none of which are applicable in this situation. Chemclene is obligated to comply with RCRA.

EPA Response: EPA agrees that Chemclene should comply with RCRA generally speaking. The commentor argues that it is EPA policy to "defer facilities that may be eligible for inclusion in the CERCLA program to the RCRA program if they are subject to RCRA corrective action." However, EPA's RCRA deferral policies deal with the deferral of listing of a site on the NPL if it can be cleaned up under RCRA corrective action. These policies were not in effect in 1983 when the Malvern TCE Site was listed on the NPL. Notwithstanding the 1983 listing of the Site on the NPL, EPA continued to pursue cleanup of the Site under the RCRA corrective action regulations until 1993, when it became clear that Chemclene was neither willing nor financially able (based upon financial analysis at the time) to cleanup the Site expeditiously under RCRA. EPA's RCRA deferral policies are designed with two goals in mind. One goal is to preserve Superfund resources if a willing and able owner/operator is available to cleanup a site under RCRA. A second goal is to preserve the procedural rights of owners and operators to the extent that the owners/operators would prefer to continue work under RCRA in lieu of a listing on the NPL. Neither goal is at issue in the Malvern TCE Site. The owner/operator does not appear to have sufficient resources to cleanup the Site, and was unwilling to cooperate fully with the RCRA corrective action program.

EPA has to date undertaken only RI/FS activities at the Site, activities which are allowed under EPA's RCRA deferral policies even if a Site has not been listed on the NPL. Moreover, the proposed NPL listing was published in the Federal Register and both the owner/operator and the public have had sufficient opportunity to challenge the listing. At this time, 14 years after the Site was listed on the NPL, there are no procedural avenues left to address in the listing process.

Furthermore, the RCRA deferral policies simply do not address or imply a right of generators and other PRPs to demand that EPA use RCRA instead of CERCLA to cleanup the Site. One can easily see why the generator PRPs would prefer the cleanup to proceed under RCRA: under RCRA EPA can order only the owner and operator to conduct the cleanup, whereas generators also may be liable for a cleanup under CERCLA. However, the RCRA deferral policy is not in any way addressed to the generators' preferences. If the generators believe that the owner/operator should be responsible for the cleanup, the proper channel for such a claim is in a contribution suit against the owner/operator. Having determined that an expeditious cleanup is not likely to occur under RCRA, EPA's decision to utilize CERCLA is not subject to second-guessing by the generator PRPs. There are still obligations under both laws. The Agency retains discretion to decide which tools to use to accomplish the result.

4. The Malvern De Minimis PRP Group is extremely concerned about allowing Chemclene to continue operating on the Site. EPA appears to be assisting Chemclene in its continued operations by adjusting the selected remedy to allow Chemclene to stay in business. In doing so, EPA is allowing the very party EPA contends aided, and in some instances, caused the release of hazardous substances into the environment to operate on the same land the company contaminated.

EPA Response: *The commentor argues that an owner and operator who contributed to the contamination at a Site must necessarily be put out of business, or at least not be allowed to use any of the Site. However, absent extreme circumstances it has been EPA's policy to avoid putting PRPs out of business as a result of CERCLA liability. The commentor is misinformed; what would be unprecedented would be for EPA to require Chemclene to cease non-RCRA business activities merely because of Chemclene's liability for contamination at the Site. EPA has selected a remedy that is protective of human health and the environment which also allows continued use of the Site and its resources.*

5. EPA's preferred alternatives neither meet the goals of nor are consistent with the management principles and expectations of the clean-up plan selection process described in the NCP.

EPA Response: EPA disagrees, and believes that both the Proposed Remedy and the Selected Remedy are consistent with the NCP. See Section LX and X of the Selected Remedy.

6. EPA's preferred alternatives likely will cause further migration of Site contaminants. The FS did not adequately consider the effects that the installation of a public water supply would have on human health. The FS failed to consider the fact that groundwater extraction, treatment, and reinjection is not more effective in protecting human health and the environment than natural attenuation.

EPA Response: Although EPA has reconsidered the extraction and treatment of groundwater at the Former Disposal Area and has selected Natural Attenuation, EPA disagrees with the conclusion that the preferred alternatives would cause further migration of the Site contaminants. ERM and Walter B. Satterthwaite Associates, Inc. (WBSA) both cited increasing VOC concentrations in time-related samples collected from pumping wells during the aquifer tests at the Former Disposal Area (CC-16 and CC-17), and Main Plant Area (CC-19 and CC-21) as evidence that pump and treat technology will contribute to plume migration at the Site. The increase in VOC concentrations from these samples provides strong evidence that pumping wells at both the Main Plant Area and Former Disposal Area should be successful in mobilizing and capturing contamination in groundwater at extraction wells. Using industry-accepted analytical modeling methods, the modeled pump and treat systems (pumping and injection wells) at both the Main Plant Area and Former Disposal Area were configured to contain the plume within the presently contaminated areas at the Site. These configurations were tested (using modeling methods) to ensure contamination could not migrate outside the cumulative capture zone for the system.

An evaluation of the effect of connecting residences to public water supplies for the Main Plant Area and Former Disposal Area in the FS indicated that alternatives MPA-G-3 and FDA-G-3, alone, were not protective of human health and the environment. Although residents would no longer use groundwater from beneath the area for drinking, or other domestic uses, contaminated groundwater could continue to migrate in the subsurface and potentially impact future residences. In the area around the Site, groundwater from the Ledger Aquifer is a source of high quality drinking water and in accordance with the NCP should be restored to beneficial use. As recently as 1992, Philadelphia Suburban Water Company withdrew water from this aquifer at a production well on Phoenixville Pike to supply local residents. In addition, Great Valley High School operated a well in the Ledger Aquifer to provide water for drinking and irrigation. Any alternative that allows highly contaminated groundwater to remain in an aquifer that has historically

been utilized as a drinking water supply cannot be considered protective of human health and the environment.

Natural Attenuation cannot be considered protective of human health and the environment at the Main Plant Area. With a natural attenuation alternative, groundwater contaminated with elevated VOC's is allowed to remain in an aquifer that has been historically used for drinking water supplies. In the best scenario, geochemical conditions (anoxic to hypoxic environment with anaerobic bacteria) are favorable for the destruction of CAH compounds to innocuous transformation products including water, carbon dioxide and chloride. If these conditions are not optimal as at the Main Plant Area, contaminants can persist in the groundwater indefinitely (in excess of 30 years). Even if geochemical conditions are favorable for the degradation of CAH's, some of the less halogenated, dechlorinated transformation products (vinyl chloride) that form as part of the natural attenuation process are considered more toxic than primary compounds (TCE, PCE). Groundwater pump and treat affords controlling migration of the contaminant plume and accomplishes removal of contaminant mass from the aquifer. Although ultimate aquifer restoration may not occur across the entire plume, contaminant mass is reduced and migration is limited to the property boundaries.

8. Soils in the vadose zone are characterized by highly heterogeneous, fine-grained soils. These soils significantly limit the effectiveness of SVE, indicating that, at a minimum, EPA should have conducted a treatability study to gauge adequately the technology's effectiveness at the site.

EPA Response: *EPA has reconsidered the use of SVE as a remedial alternative for soil at the Main Plant Area. At the time of this decision, EPA has determined that the installation of the cap at the Main Plant Area will provide necessary protection of groundwater.*

9. The distribution of substances detected in on-Site soils at the Main Plant Area is characterized by limited and isolated pockets with only trace levels of chemical outside these isolated hot spots. Therefore, EPA should evaluate alternatives which focus on the isolated and relatively shallow hot spots, with institutional and/or engineering controls for the remainder of on-Site soils which pose little or no long-term threat.

EPA Response: *An evaluation at the Main Plant Area indicated that soil contamination as characterized by soil samples (contamination sorbed to soil particles) and vapor readings (soil gas) indicated that contamination occurred in three primary areas of concern (former underground storage tanks, aboveground storage tanks, and distillate condensate disposal area). Seventeen of the 42 subsurface samples analyzed at the Main*

- *Plant Area exhibited concentrations elevated above Site specific Soil Screening Levels (SSLs). EPA disagrees that contamination is relatively shallow, contamination in the vadose zone in all three areas extended to depths as great as 100 feet. Beneath each of these areas, concentrations and PID measurements were sufficiently elevated to suggest the presence of DNAPL, although DNAPL was never encountered in soil samples. EPA has, however, determined that engineering controls such as soil capping should provide adequate protection of groundwater, along with pump and treat.*

10. The NCP states that, when groundwater restoration is not practical, EPA should ensure other protection to prevent the further migration of contaminants, prevent exposure to contaminated groundwater, and evaluate the need for further risk reduction. Data for the site indicates that this should be done. The proposed groundwater extraction alternative is likely to create additional contaminant migration beyond that which would occur naturally. The combination of hydrogeologic barriers and natural attenuation has prevented the plume from migrating. Therefore, groundwater extraction and treatment are not necessary or appropriate.

EPA Response: EPA agrees that groundwater pump and treat is not necessary at the Former Disposal Area and has reconsidered the implementation of this technology at the Former Disposal Area. Historical contaminant concentrations from groundwater samples have been declining since 1990 after removal of drums and contaminated soil at the Mounded Area. In addition, the presence of significantly elevated concentrations of transformation products of TCE, PCE, and 1,1,1-TCA indicates that the natural attenuation processes are relatively advanced. In most of the monitor wells, concentrations of degradation products is equal to or greater than concentrations of primary CAH's.

However, EPA believes pump and treat technology is necessary and appropriate at the Main Plant Area. EPA believes that the extent of groundwater contamination at the Main Plant Area may not be fully defined. In addition, an evaluation of CAH concentrations indicates the process is not as advanced as it is at the Former Disposal Area. Total VOC concentrations in individual monitor wells have been stable since 1990. In addition, at many wells concentrations of less chlorinated transformation products are several times less than concentrations of primary CAH's. CAH concentrations in groundwater appear to be in equilibrium with a source in the vadose zone. Modeling simulations conducted using site-specific half-lives indicate that TCE is the most persistent CAH at the Main Plant Area and would require greater than 35 years to degrade below the MCL of 5 ug/l. A major assumption inherent to the degradation model equations is that contamination is in the aqueous phase and there is no DNAPL source replenishing degrading contaminants.

The use of pump and treat technology in the source area at the Main Plant Area is intended to reduce contaminant mass and prevent further migration from the Chemcene property. Time-related groundwater samples collected during the 24-hour aquifer tests at CC-19 and CC-21 indicate that extraction wells would be successful in mobilizing and collecting contaminants. Although, results of DNAPL screening utilizing several analytical techniques indicate that DNAPL may be present in the vicinity of CC-6, CC-7, and CC-13, visual evidence of DNAPL has never been encountered at the Site. The response to the pump and treat system in the suspected DNAPL area will be evaluated during the operation of the system. If it is determined through performance monitoring that it is impracticable to reach the cleanup standards, these standards will be changed in the DNAPL area.

11. During sampling conducted by EPA in May 1996, EPA found contaminant levels increased over a 24-hour period. The data indicates that pumping to obtain the samples caused significantly more plume migration in 24 hours than had occurred naturally in more than 15 years. This field test data indicates that the proposed alternative may actually be detrimental to human health and the environment.

EPA Response: EPA disagrees and believes the data shows otherwise. Many aspects of this comment have been addressed above.

12. The regional potentiometric surface map indicates that the elevation of the water surface surrounding the discontinuous plume is at an identical or higher elevation than the water surface at the Former Disposal Area. This area lies to the west of the flow path from the Former Disposal Area and another off-site source of contamination likely contributes to this condition. In addition, domestic well D-58, located in the center of the domestic well plume, contains no 1,1,1-trichloroethane (1,1,1-TCA) or 1,2-dichloroethane (1,2-DCA) two primary contaminants found in the plume at the Former Disposal Area in well CC-5.

EPA Response: This comment was already addressed in Section C, #1 above.

13. EPA calculated the rates of natural degradation at both the Main Plant Area and Former Disposal Area using half-lives calculated from historical site data for TCE and 1,1,1-TCA. Since the half-life values for these chemicals were based on actual site data, the degradation rates EPA calculated assume no source treatment. EPA did not consider, in either the FS or the Proposed Plan, the impacts of natural attenuation or marginal improvements in time to achieve Maximum Contaminant Levels (MCLs) under the proposed alternative.

EPA Response: The time of attenuation for TCE and 1,1,1-TCA reported in the RI

Report are based on the assumption that all contaminant mass is in the aqueous phase (assumption 1., page 5-39), and that there is no source (analytical equations in Table 5-3) to replace degrading CAH's. This evaluation essentially assumes that the source of contamination has been removed from each site. To maintain the conservativeness of the evaluation, CAH concentrations from the most contaminated wells were modeled for both sites (CC-5, Former Disposal Area; CC-7, Main Plant Area). In evaluating the present conditions at the site, these analyses are more valid for the Former Disposal Area than the Main Plant Area, where soils in the vadose zone appear to continue leaching contaminants to the groundwater. The intention of these analyses were to illustrate CAH degradation with time, under existing site conditions in the absence of a contaminant source.

WBSA's contention that remedial alternatives for groundwater (FDA-G-6, MPA-G-6) at the Former Disposal Area and Main Plant Area provide only marginal improvements in time to achieve MCL's is not valid. Evaluation of alternative FDA-G-6 indicates that with a combination of pumping at a single extraction well at 500 gpm for two years and natural attenuation all CAH's should degrade below their respective MCL's in 7 years from the beginning of remediation. Time of remediation using FDA-G-6 is significantly more rapid than for natural attenuation (FDA-G-4) which requires 16.5 years to achieve MCL's. Comparison of improvements for the time of remediation at the Main Plant Area between Alternatives MPA-G-4 and MPA-G-6 if all contamination in groundwater is in the aqueous phase. With dissolved phase contamination, concentrations should decline below MCL's in 19.5 years using alternative MPA-G-6. Assuming the source of contamination in the vadose zone is removed, contaminant concentrations should decline below MCL's in 35 years. However, a comparison of true improvements between alternatives is not valid if DNAPL is present. With DNAPL, pumping will continue for 30 years to reduce contaminant mass and prevent offSite migration. In the presence of DNAPL, natural attenuation will require significantly longer than 35 years to degrade below MCLs dependent on the strength of the source concentration.

14. Assuming public water is made available, which would reduce the risk of exposure to groundwater to zero, institutional controls preventing construction activities on the site would eliminate current and future risks.

EPA Response: *Although the current risk of exposure to groundwater can be eliminated by connecting residents at both areas of concern to public water, this measure does not address leaving elevated concentrations of CAH's in the Ledger Aquifer. The Ledger Aquifer has been a historical source of high quality water supplies for residents in the area around the Malvern TCE area.*

15. EPA rejected all technologies involving the excavation and ex-situ treatment of contaminated soil at the Main Plant Area because, in the FS, EPA determined that the contamination was too deep to be removed. EPA's conclusion was faulty because: (1) only two samples contained concentrations high enough to be considered a potential source of future groundwater degradation and (2) if the objective was to eliminate exposure of future construction workers, the depth of the soils posing a risk to these future workers certainly is not too deep to be excavated.

EPA Response: EPA disagrees and believes the facts show otherwise. WBSA's comments that only two subsurface soil samples collected at the Main Plant Area contained concentrations sufficiently high to be considered a potential source of contamination to groundwater is incorrect. Of the 42 subsurface soil samples (collected from 12 borings) submitted for laboratory analysis, 17 exhibited concentrations of one or more compounds in excess of the site specific SSL's (FS Appendix B, Table B-4). Nine of the seventeen samples were collected at depths greater than 40 feet below grade. As the objective of excavation is to remove all contaminated soils with concentrations greater than SSL's rather than selected easy-to-access areas, excavation of contaminated soil at the Main Plant Area was not considered practicable.

16. A significant concern for SVE at the Main Plant Area is heterogeneity of the subsurface soil, which could result in pockets of soil contamination that cannot be treated with SVE. The factors that caused EPA to reject soil flushing as a possible clean-up option would be just as detrimental to in-situ SVE. Therefore, consistent with the NCP, EPA should conduct a pilot scale treatability study. Therefore, EPA either should have rejected SVE or should not have rejected soil flushing during the preliminary screening process.

EPA Response: EPA has reconsidered implementation of an SVE alternative at the Main Plant Area. EPA believes that capping alone provides an equivalent level of protectiveness and long term effectiveness as SVE while being more cost effective. Prior to this decision a pilot study was planned for mid September that included a vacuum extraction well and four observation clusters. Although the alternative has been reconsidered, remediation with SVE could be effective at the Main Plant Area even in the presence of heterogeneous soils. The thick (around 70 feet) vadose zone at the Main Plant Area has been characterized by 12 borings. An additional five borings with continuous sampling would have been added for the pilot study.

Geologic interpretation of the vadose zone indicates that there are thick, partly continuous zones of well sorted sands (RI Figures 3-3, 3-4, 3-5, 5-1 and 5-2) interbedded with silt and clay. Soil contamination as characterized by analytical results from soil samples and PID measurements indicates that contaminants occur in all lithology types

at the Main Plant Area. Typically contamination in finer grained soils is found adjacent to a more permeable sand unit (Figures 4-3, 4-4, and 4-5). Contaminant distribution patterns in horizontal lithologic sections (RI Figures 5-1 and 5-2) indicate that contamination appears to have migrated through permeable units and collected at the interfaces marked by a lithologic change. By careful spacing of vapor extraction wells, air flow in the subsurface could be optimized to remediate contaminated soils in the highly permeable units and contaminant accumulations in proximal fine-grained soils.

Soil flushing was not considered equivalent to SVE in its ability to remediate soils at the Main Plant Area during the FS process because air is a significantly more effective carrier in the vadose zone than water (Fam, 1996). With SVE, air flow in the vadose could be more easily controlled than the flushing. Careful design of the SVE extraction well placement and screen intervals could take advantage of the heterogeneity at the Main Plant Area to develop an effective SVE system.

17. EPA should use caution when selecting gradient-control utilizing extraction wells to minimize DNAPL migration in groundwater. This is important particularly in the heterogeneous fractured carbonate aquifer where the direction of groundwater flow within individual water bearing units and the consequences of artificial gradient manipulation are impossible to predict. Using this technology likely would cause an increase in the mobility of contaminants which currently are contained by natural conditions.

EPA Response: Alternative MPA-G-6, using pump and treat technology to remove contaminants at the source area and downgradient areas of the plume at the Main Plant Area was designed to collect groundwater contaminants and prevent further downgradient migration. The mobilization of contaminants toward points of lower potentiometric head at extraction wells is not a valid argument for rejection of pump and treat technology. Mobilization of contaminants toward extraction wells as indicated by time-related sampling during pumping tests at the Main Plant Area and Former Disposal Area is the fundamental purpose of pump and treat technology. The system element of greatest concern in regard to migrating contamination is the injection well system, which could potentially drive contaminants away from the site. However, contaminants in the source area should not be affected by injection in downgradient areas of the site.

18. While EPA stressed that caution should be used to prevent DNAPL migration when evaluating containment, EPA did not consider this when evaluating collection and treatment, even though they are similar technologies in terms of the groundwater pumping process. Collection and treatment has been shown to cause contaminant migration within and between water bearing units in the aquifer, therefore EPA should reject it since it violates one of the RAOs.

- EPA Response: See Response to E.17.

19. EPA did not consider innovative technologies to address groundwater contamination at the Main Plant Area, as stipulated in the NCP.

EPA Response: The hydrogeologic setting at the MPA, a fractured bedrock aquifer, is not compatible with a number of the new insitu, innovative technologies for groundwater remediation. As an example, WBSA recommendation for the use of an insitu reactor or reactor wall at the Main Plant Area is not feasible because there is no practical method for installing the reactive wall in the bedrock aquifer overlain by 40 to 100 feet of unconsolidated overburden. Injection of granular reactive iron through injection wells results in accumulation of this material in the bottom of the injection wells with no dissemination into the aquifer. New semi-passive well technologies (Wilson, et.al., 1997) utilizing reactive materials have not been implemented on actual Sites and have not been tested in bedrock environments. Most of these technologies were rejected before preliminary screening because they are not compatible with the hydrogeologic environment at the Site. This approach was selected rather than developing a long list of technologies that are quickly rejected in the screening task

20. EPA incorrectly evaluated soils at the Former Disposal Area by inadequately reviewing gradient control and groundwater collection.

EPA Response: Comment E.20, derived from WBSA's comment 7, was somewhat confusing in relating gradient control and groundwater collection to the evaluation of soils remediation at the Former Disposal Area. The main intention of the comment appears to have been that gradient control at the Former Disposal Area was retained during the screening process (FS; Table 3-5), but considered impracticable because of high transmissivity in the Ledger Aquifer, while groundwater extraction was retained without mention of limitations. WBSA's cites this relationship as an inconsistency in the FS. Analytical flow and numerical transport modeling (FS; Appendix D) demonstrated that contaminants could be collected at relatively high flow rates with one to four extraction wells. However, gradient control and drawing the downgradient portion of the plume back toward the Former Disposal Area required even more elevated pumping rates from additional wells. As part of the single pumping well collection alternative (FDA-G-6; Appendix D), modeling indicated that a large portion of the contaminant plume would decouple from the Site and continue migrating downgradient, where it would naturally attenuate.

21. EPA stated that the effectiveness of SVE depends on the soil matrix, grain size, and

moisture. However, the two areas with the highest contaminant concentrations at the Main Plant Area contain soils comprised of moist to wet silt and poorly graded sand with silt and clay. These soils types would inhibit SVE's effectiveness.

EPA Response: WBSA's comment regarding the moisture content of soils at the Main Plant Area and SVE effectiveness is noted as a concern for SVE. At present, EPA has reconsidered implementation of an SVE alternative (MPA-S-4) at the Main Plant Area. Alternative MPA-S-4 was, however, rejected because of concerns with the variable moisture content of subsurface soils. Moisture content of soils at the Main Plant Area varied across the potential area for SVE treatment. As an example, thick beds of well sorted sands encountered beneath the distillate condensate area were dry and friable. An SVE pilot study was planned for the Site to help understand the effects of heterogeneities in lithology and moisture content. However, it is no longer necessary because an alternative remedy was chosen.

22. EPA concluded that pneumatic fracturing and thermal enhancements may increase the effectiveness of SVE if the future pilot study indicates that SVE is not effective. However, pneumatic fracturing will not provide significant benefits since it is best suited to brittle clays with low plasticity, conditions not present at the Site.

EPA Response: WBSA's comment regarding the feasibility of pneumatic fracturing at the Main Plant Area is noted; however, SVE is not currently planned for use at the Site.

23. The preliminary design for the SVE system assumes five extraction wells averaging 50 feet deep to capture contaminants over an area approximately 60 feet by 60 feet. This assumption is inconsistent with soil data collected during the RI.

EPA Response: At this time, EPA has reconsidered implementation of the SVE alternative at the Main Plant Area. However, contrary to WBSA's comment that the evaluation of soil lithology in FS Section 4.3.1.4 was incorrect, data show that thick beds of dry, well sorted sands underlie the potential area of treatment at the Main Plant Area (Figures 3-3, 3-4, and 3-5) as stated in the FS. This lithology was also described in the preliminary screening (FS Section 3.3.1.4). Subsequently, it is difficult to identify inconsistency in the FS regarding the description subsurface soils.

24. In terms of cost, EPA did not consider the possible need to alter the design of the SVE system, nor did EPA consider the cost of implementing another alternative if the SVE alternative does not work. In addition, Site data do not support the general conclusion that Site-wide treatment of soils is necessary.

EPA Response: WBSA's comment regarding cost analysis of alterations to SVE design or contingencies if SVE is not successful is noted. The actual design of the SVE system was to be based on the results of a comprehensive pilot study. Many of the design criteria for the system were to be developed from the pilot study. Subsequently, assumptions made for costing the FS might have changed.

25. EPA did not consider the combination of natural attenuation and public water adequately. EPA stated that the public water alternative would not provide for any reduction in the mobility of the groundwater plume. However, abandoning the existing wells will eliminate pathways for contaminant migration among individual water-bearing fractures in the residential wells. In addition, eliminating residential pumping will reduce the rate of future contaminant migration.

EPA Response: At present, EPA has reconsidered implementation of the groundwater pump and treat system at the Former Disposal Area (FDA-G-6). However, the discussion of public water supply and natural attenuation in the FS (Sections 4.3.4.3 and 4.3.4.5) was correct in stating that neither alternative was protective of human health and the environment. Although abandonment of local residential wells will prevent current exposure to contaminated groundwater, Alternatives FDA-G-3a and G-4, allow elevated concentrations of CAHs to remain in an aquifer that has been traditionally used as a source for high quality public drinking water supplies. The NCP considers groundwater a public asset that should be evaluated for restoration to beneficial use. With Alternatives FDA-G-3a and FDA-G-4, groundwater cannot be used public consumption until natural attenuation meets health-based goals of MCLs.

26. Without any remedial measures having taken place, the contaminant plume has migrated less than 150 feet. For dissolved-phase VOCs in a highly transmissive fractured carbonate bedrock aquifer, this is an extremely rare occurrence. This clearly demonstrates that natural attenuation processes are effective in controlling contaminant migration in groundwater at the Main Plant Area. Because natural attenuation has been proven to demobilize VOCs in groundwater and cause a reduction in the volume and toxicity of the contaminant plume, natural attenuation satisfies several of the RAOs for groundwater at the Main Plant Area.

EPA Response: EPA does not believe the full extent of the VOC contaminant plume in groundwater at the Main Plant Area has been fully characterized. The RI report documented groundwater flow from the Site to the northeast. The monitoring wells located off the Chemclene property are located east of the Site. The evidence suggests that the low VOC concentrations seen in these monitoring wells may be due to lateral dispersion, not natural attenuation, and the longitudinal axis of the VOC plume may be

oriented to the northeast. The extent of contamination in this direction will be determined during the remedial design phase.

The mechanism and nature of CAH degradation in groundwater at the Main Plant Area is uncertain. Groundwater beneath the Main Plant Area is oxic (dissolved oxygen > 2.0 mg/L), and subsequently not compatible with the dechlorination and dehalogenation of CAHs by biodegradation. Degradation of CAH's is typically associated with anaerobic bacteria in an hypoxic to anoxic environment (Barbee, 1994). An evaluation of the concentrations of primary CAHs (TCE, PCE, 1,1,1-TCA) in relation to dechlorinated transformation products (cis 1,2-DCE, vinyl chloride, 1,1-DCE, etc.) suggests that the progress of degradation is not advanced. Furthermore, the constituent ratios of transformation products to primary products are not increasing with time as expected at a Site where contaminant concentrations and migration is controlled by natural attenuation. An evaluation of concentration ratios conducted along the centerline of the plume using data from May 1996 indicates that ratios of transformation products to primary CAHs remain stable with distance from the contaminant source area (RI Figure 5-9). These concentration relationships would suggest that whole scale natural attenuation is not occurring in groundwater at the Main Plant Area.

27. Using the proposed groundwater collection, treatment, and discharge system, EPA estimated that, assuming source control or removal, the contaminant plume will be remediated below MCLs in 19.5 to 32.5 years, depending on the success of the hydrofracturing. This assumption is incorrect for three reason: (1) available data indicate that pumping caused a significant migration of the plume; (2) hydrofracturing may cause contaminants to migrate into new water-bearing units not previously intercepted and could alter the hydrogeologic characteristics naturally containing the plume; and (3) the time frame estimate for remediation is based on the unrealistic assumption that DNAPLs are not present.

EPA Response: EPA disagrees and believes that the facts demonstrate otherwise. This response is based on WBSA's previous comment that contains three reasons that assumptions for estimating time of remediation for alternative MPA-G-5 were flawed. On the contrary, estimates of the time of remediation for the contaminant plume at the Main Plant Area were correct based on the assumption that contaminants were in the dissolved phase. In direct contradiction to WBSA's previous comment, the FS (Section 4.3.2.5) clearly states that additional pumping time would be required for a DNAPL source below the water table.

As stated in earlier réponses, mobilization of contaminants toward pumping wells as demonstrated during the 24-hour pumping tests, is not a indication that implementation

of pump and treat technology causes additional migration of the contaminant plume. As indicated in the RI, time-related sampling results from the pumping tests indicate that contaminants can be mobilized and captured at extraction wells. Hydraulic fracturing at the Main Plant Area is intended to increase extraction well performance (specific capacity, yield, efficiency, etc.) by propagating fractures into the rock matrix and limit the influence of diffusion on remediation. Increasing fracture aperture and propagating fractures into the rock benefits the performance of an individual extraction well and ultimately the entire extraction well system. Subsurface investigations at the Main Plant Area to date have not indicated that the Ledger Aquifer is separated into discrete aquifer zones whose integrity would be compromised by the propagation of fractures.

28. Public water combined with natural attenuation is the only appropriate remedy. Natural attenuation ensures that no further migration of the contaminant plume will occur.

EPA Response: EPA disagrees and believes the NCP suggests a different answer. Comment E26 addresses concerns about using only public water supply (WS-G-3a) and natural attenuation (MPA-G-4) for the remediation of groundwater at the Main Plant Area. EPA has reconsidered the implementation of a pump and treat alternative (FDA-G-6) at the Former Disposal Area and will rely on public water supply and natural attenuation for remediation of the contaminant plume at the Former Disposal Area. Importantly, EPA has concluded that both these choices satisfy the key goal of protection of public health.

29. EPA assumed that the cap at the Former Disposal Area will be effective in eliminating the risk of direct contact with soils, but if the cap is damaged, a plume of contaminated groundwater caused by leaching could be reactivated. This assumption is incorrect because, since the early 1980s, natural attenuation has resulted in the contraction of the contaminant plume.

EPA Response: The intent of this comment is noted. However, a break in a cap at the Former Disposal Area could result in a relative increase in contaminant concentrations in groundwater. Based on evaluations of historical analytical data, increasing concentrations due to loss of cap integrity should cause only a brief increase in concentrations above levels at the time of the break.

30. Not only has the groundwater plume at the Former Disposal Area been contained, but it has been contracting for several years. Therefore, natural attenuation provides a higher degree of short-term effectiveness. Since there appear to be no DNAPLs present at the Former Disposal Area, the length of time required to achieve MCLs in the Former Disposal Area plume likely will be significantly shorter than at the MPA. Since the

- contaminated soil area at the Former Disposal Area has not had an adverse impact on water quality, vadose zone source removal or control is not critical. Eliminating the risks associated with direct contact with soils, combined with public water and natural attenuation, could be a cost effective combination of alternatives that meet the RAOs and ARARs for soils and groundwater at the Former Disposal Area.

EPA Response: EPA has reconsidered implementation of groundwater extraction and treatment remedial alternative (FDA-G-6) at the Former Disposal Area and has decided to choose natural attenuation. An evaluation of historical analytical data at the Former Disposal Area indicates that the rate of decline in constituent concentrations has decreased over the last two sampling events (May and December 1996). A portion of this trend is shown in Figure 5-5 of the RI Report, where total concentrations of 1,1,1-TCA, TCE, and PCE were close to historical maxima in monitor wells CC-5 and CC-10. The decrease in the rate of CAH degradation may indicate that contaminants in groundwater are reaching equilibrium with residual contamination in the vadose zone. If time-related concentrations in groundwater reach steady state, the ultimate time of attenuation may increase. Estimates of time of attenuation performed during preparation of the RI Report were based on Site-specific degradation rate constants calculated during a period of plume recession. If concentrations become stable with time, rate constants will become smaller, and the original estimates for duration of attenuation will have been underestimated.

Remediation of soil in the vadose zone at the Former Disposal Area will help enhance the natural attenuation process. Removal of residual contamination should result in another episode of plume recession and ultimately the degradation of contaminant concentrations below MCL's.

F. Comments of the National Park Service division of the United States Department of the Interior

In an undated two-page letter, E. Scott Kalbach, Acting Superintendent of Valley Forge National Historical Park, submitted comments on behalf of the Valley Forge National Historical Park, part of the National Park Service division of the U.S. Department of the Interior. Mr. Kalbach submitted comments to EPA regarding the Proposed Plan for the Malvern TCE Site.

1. Chemicals and metals from the Malvern Site have the potential to contaminate surface water draining into Valley Creek. The Proposed Plan does not include any mitigating actions for Valley Creek, which is an Exceptional Value waterway and a Class A Wild Trout Stream.

EPA Response: Based on the results of the RI, EPA has concluded that the contaminants of concern at the Malvern Site are generally VOCs and in one area, low levels of PCBs. EPA has sampled surface water closest to the source areas on the Chemclene property and in Valley Creek and has concluded that contaminants from the surface water at the Site have not impacted Valley Creek. Additionally, VOCs are not detected by the time groundwater from the Site discharges to Valley Creek. However, as part of the Selected Remedy, the groundwater contaminant plume in the vicinity of the Former Disposal Area will be monitored to ensure that Valley Creek is not impacted in the future.

2. Collection of baseline data may be necessary to develop standards for measuring changes over time in both water chemistry and the aquatic biological community.

EPA Response: During the ecological field evaluation the benthic community directly found on the Site, in the area of highest contamination, was not found to be impaired. In fact, the benthic community was found to be productive and healthy. In addition, toxicity tests conducted with benthic organisms indicated no adverse effects in any sediment samples collected from the Site in the area of highest contamination. Therefore, there is no indication or justification for evaluating other areas which are likely to be less contaminated and for which we can make no causal link to the Site as the source.

3. EPA's failure to address Valley Creek in the Proposed Plan is the result of a deficient Ecological Risk Assessment in the RI Report. EPA investigators visited the Malvern Site to test Valley Creek on June 20, 1995, a day when there was no water in the creek. Therefore, investigators took no samples of water, sediments, or microorganisms.

EPA Response: Valley Creek was sampled in the Ecological Risk Assessment and was found to have TCE concentrations just above detection limits. The Ecological Risk Assessment utilizes a gradient approach to sampling. By gradient, samples are collected which represent a range of concentrations known (by literature review) to potentially cause adverse effects. Since Valley Creek was just above non-detection, it did not represent a potential issue in the Ecological Risk Assessment and other sampling locations with elevated concentrations of Site contaminants were evaluated intensely. The theory here, is that the concentrations which cause adverse effects are identified. Near non-detect values did not result in adverse effects, thus Valley Creek was not at risk.

4. A more complete biological survey would have revealed that a few years ago a bog turtle, proposed for federal listing as a threatened species, was discovered in this wetland and the a state-listed endangered plant, the possum haw was found on a nearby hillside.

EPA Response: This was an oversight in the biological survey. However, this wetland is not located at the Site and incomplete exposure pathways appear to be associated with both of these species.

6. EPA did not consider the possibility that the cone of depression from dewatering at Catanach Quarry may interfere with the contamination plume from the Malvern Site. Although Catanach Quarry currently discharges into a sinkhole, the Quarry may request permission from PADEP to discharge to Valley Creek after Warner Quarry closes.

EPA Response: EPA is aware of the cone of depression from the Catanach Quarry and discusses this in the RI and the ROD.

7. Two other Superfund Sites exist in the Valley Creek watershed: Foote Mineral and Paoli Rail Yard. In addition, Knickerbocker Landfill, now closed due to illegal hazardous waste dumping, is located nearby. EPA did not consider the combined effects of these Sites on Valley Creek as part of the environmental risk assessment of the Malvern Site.

EPA Response: The purpose of the Ecological Risk Assessment was to evaluate potential ecological impacts of the Malvern TCE Site. Ecological Risk Assessments are Site specific and are developed for all Superfund Sites. As stated above in response #1, EPA believes that the data show that the Valley Creek has not been impacted by the Malvern TCE Site. Therefore, the combined impacts of Malvern TCE with other sites in the area is beyond the scope of the Superfund program.

G. Comments of a North Phoenixville Pike Couple

In a one-page letter dated August 27, 1997, a couple living on North Phoenixville Pike submitted comments regarding the Proposed Plan to cleanup the Malvern Site.

1. Although EPA stated that the connection of residences to the public water supply is, at this stage, a proposed alternative, there are stakes on residential properties for the purpose of installing the water lines. It seems that the decision to provide public water already has been made. In addition, the layout of the water lines does not coincide with the property lines.

EPA Response: The current construction activity is being conducted exclusively by the Philadelphia Suburban Water Company and is independent of EPA's Selected Remedy.

2. Although the couple agrees with EPA's decision to provide public water to residents with contaminated wells, the couple believes that the public water supply currently is more

contaminated than their well. As a precaution against possible contamination, this couple installed and has maintained a carbon filter on their well since 1980, at their own expense. This couple does not wish to be connected to the public water supply.

EPA Response: EPA has selected the provision of a public water supply for the homes impacted or potentially impacted by the Site. Groundwater use for human consumption is prohibited once the public water supply is implemented. EPA believes the public water supply is more protective and reliable than the continued use of home wells.

3. This couple will not decommission their well. Their 19-acre property is protected by Act 319 (Clean and Green Program) and supports young Christmas trees, fruit trees, soft fruits, asparagus, and vegetables. The couple wishes to keep their well for agricultural purposes.

EPA Response: The remedy prohibits use of groundwater for human consumption. In addition, any future groundwater use should not interfere with EPA's selected remedy. From EPA's perspective groundwater use for irrigation purposes that does not interfere with the migration of contamination from the Former Disposal Area or the Main Plant Area would be acceptable. However, there are state and county regulations which may prohibit such use. This issue will be addressed during remedial design.

4. The property located at 218 Phoenixville Pike currently is vacant. Although the house that formerly occupied the property was torn down, the well (formerly on a filter) and electric utilities remain. If a public water main is brought down Phoenixville Pike, the property at 218 Phoenixville Pike should be connected because the possibility for future occupancy remains.

EPA Response: Connections to the public water supply will only be made for current residences.

H. Comments of the Pennsylvania Environmental Defense Foundation

In a one-page letter dated August 25, 1997, Chuck Marshall Chair of the Pennsylvania Environmental Defense Foundation, submitted comments regarding the Proposed Plan to cleanup the Malvern Site.

1. The Pennsylvania Environmental Defense Foundation supports EPA's preferred alternative. OffSite Excavation and Treatment appears more costly while only marginally more effective than the preferred alternative. Anything other than soil vapor extraction, capping, and pump-and-treat does not appear to reduce the plume and the contamination.

EPA Response: EPA has made modifications to Proposed Remedy in the final Selected Remedy which EPA believes provides an equivalent level of protectiveness and cost effectiveness.

2. EPA does not appear to have evaluated the impact of the injection and withdrawal wells on Valley Creek. EPA should ensure that neither surface water runoff nor groundwater flow impact the creek.

EPA Response: The Selected Remedy for the groundwater at the Former Disposal Area is Natural Attenuation. Therefore, there is no impact to Valley Creek from a pump and treat system. EPA has responded above in F.1 regarding any impact to Valley Creek from the Site contamination.



The U.S. Environmental Protection Agency Announces Record of Decision for Malvern TCE Superfund Site

On November 26, 1997, the United States Environmental Protection Agency issued the Record of Decision (ROD) for the Malvern TCE Superfund Site located in East Whiteland Township, Chester County, PA. The ROD details the final selected remedy for the site. The remedy includes the following major components:

1. **Water Supply** - Installation of a waterline to prevent contact with groundwater contamination at residences affected or potentially affected by the Site.
2. **Main Plant Area Soils** - Installation of a cap to prevent direct contact with contaminated soils at the Main Plant and to reduce the potential migration of these contaminants to the groundwater.
3. **Main Plant Area Groundwater Plume** - Extraction and treatment of groundwater via air stripping followed by carbon adsorption or ultraviolet oxidation and subsequent reinjection of treated water to the aquifer to restore the Site groundwater to beneficial use by reducing contaminated concentrations to Maximum Contaminant Levels established by the Safe Drinking Water Act.
4. **Former Disposal Area/Mounded Area Soils** - Excavation, off-site treatment and disposal of contaminated soils to reduce the potential for continued migration of contaminants in these soils to groundwater.
5. **Former Disposal Area/Mounded Area Groundwater Plume** - Implementation of a natural Attenuation program to monitor reduction of contaminant concentrations in groundwater to Maximum Contaminant Levels established by the Safe Drinking Water Act.

These remedial actions were selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Substances Pollution Contingency Plan (NCP). The EPA believes that the selected remedy will comply with all Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action. The selected remedy utilizes a cost effective, permanent solution to the maximum extent practicable and satisfies the statutory preference for a remedy that reduces toxicity, mobility, or volume while protecting human health and the environment.

Because this remedy will result in hazardous substances remaining on-site, above health-based levels, a review by the EPA will be conducted within five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

The Administrative Record is available for review at:

Chester County Library
400 Exton Square Parkway
Exton, Pennsylvania 19341
(610) 363-0884

US EPA Region III Library
841 Chestnut Building
Philadelphia, PA 19107
Hours: 8 AM to 4 PM Monday-Friday
Contact: Ms. Anna Butch (215) 566-3157

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